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A NEED TO KNOW:

THE ROLE OF AIR FORCE RECONNAISSANCE
IN WAR PLANNING, 1945-1953

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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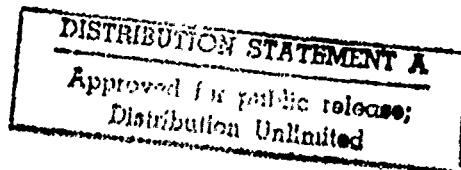
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In Memory of Ana Jonus

(1898-1991)

**A Strong, Simple, Loving Woman
Who Lived Her Life One Day at a Time**

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At my back I always hear, time's winged chariot drawing near.

Andrew Marvel

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Exploring a topic that borders upon still classified material poses a tremendous problem for a researcher. As an Air Force officer and a former

navigator in reconnaissance aircraft, I understand the rationale for maintaining secrecy for more current aspects of this field. As a result, this dissertation has passed appropriate security clearance procedures. On the other hand, I believe that the efforts of the many unsung individuals must be recognized in Cold War history. I understand the values and sacrifice of the Air Force personnel involved in aerial reconnaissance. I hope my exploration, although limited in time and focus, provides an understanding of the origins of strategic aerial reconnaissance. All opinions expressed are my own and do not represent the United States Air Force.

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ABBREVIATIONS

AAA	Antiaircraft Artillery
AAC	Alaskan Air Command
AAF	Army Air Forces
ADC	Air Defense Command
AI	Air Intercept (radar)
AOB	Air Order of Battle
AOC	Association of Old Crows
BDA	Battle Damage Assessment
CEP	Circular Error Probable
COMINT	Communications Intelligence
ECM	Electronic Countermeasures
ELINT	Electronic Intelligence
EOB	Electronic Order of Battle
EW	Early Warning (radar)
EW	Electronic Warfare
EWO	Electronic Warfare Officer
FEAF	Far East Air Forces
FEC	Far East Command
GCI	Ground Controlled Intercept (radar)
IFF	Identification Friend or Foe
JCS	Joint Chiefs of Staff
JIC	Joint Intelligence Committee
JNEIC	Joint Nuclear Energy Intelligence Committee
JPS	Joint Staff Planners
JWPC	Joint War Plans Committee
KAL	Korean Air Lines

mc	megacycles
MHz	Megahertz
MiG	Mikoyan-Gurevich
NA	National Archives
NHC	Naval Historical Center
NSC	National Security Council
RAC	Radar Approach Chart
RAF	Royal Air Force
RCM	Radio Countermeasures
RFC	Royal Flying Corps
RRL	Radio Research Laboratory
SAC	Strategic Air Command
SESP	Special Electronic Airborne Search Project or Special Electronic Search Project
SRS	Strategic Reconnaissance Squadron
SRW	Strategic Reconnaissance Wing
TAC	Tactical Air Command
TCRAC	Target Complex Radar Analysis Chart
UN	United Nations
US	United States
USA AF	United States Army Air Forces
USAF	United States Air Force
USAFE	United States Air Forces Europe
USAFHRC	United States Air Force Historical Research Center
USSBS	United States Strategic Bombing Survey
WSSEG	Weapons Systems Evaluation Group

INTRODUCTION

On September 1, 1983, a Sukhoi Su-15 fighter plane attacked Korean Air Lines (KAL) flight 007 after the plane's intrusion into Soviet air space, killing the 269 people on board. News of the incident seized media headlines and prompted a blistering US denunciation of Soviet barbarism. In response, the Soviets accused the United States of manipulating the airliner in an espionage ploy involving an American reconnaissance aircraft. The ensuing war of rhetoric and diplomatic sanctions imposed by the United States plunged US - Soviet relations into another icy phase of the Cold War. Furthermore, the KAL incident focused world attention upon a little-known, but highly significant aspect of the Cold War -- strategic aerial reconnaissance.

The vehement charges and counter charges surrounding KAL 007 evoked similar periods of international tension involving United States reconnaissance aircraft during the early years of the Cold War. For example, the effect of KAL 007 upon Soviet-American relations reminded many of Francis Gary Powers' ill-fated U-2 mission of May 1, 1960. In addition, the KAL incident resurrected the hostility associated with a series of international incidents occurring in the early 1950s. To assess the apparent impact of aerial reconnaissance upon the Cold War, many questions must be answered: How and when did reconnaissance flights originate? What factors prompted U. S. reconnaissance operations? Who authorized them? At what point did the President and senior policy makers know about the activities? What information

did US policy makers seek that could be provided by aerial reconnaissance?

At first glance, strategic aerial reconnaissance appears to be a mere technical tool. The term refers to the use of aircraft to collect strategic intelligence using photographic or electronic means. According to the Joint Chiefs of Staff (JCS), "strategic intelligence" refers to "Intelligence that is required for the formation of policy and military plans at national and international levels."¹ Although strategic intelligence includes information provided by sources other than aircraft, including naval vessels, ground communications intercept sites, satellites, published literature, defectors, and spies, this study will focus upon the origins of strategic aerial reconnaissance because aircraft provided the bulk of information used by American war plans from 1945-1953.² At the core of the topic, recently declassified JCS Emergency War Plans indicate that a strategic air bombardment campaign formed the heart of American military strategy from the end of World War II to the Korean conflict. A study of strategic aerial reconnaissance illuminates the link between intelligence and strategy and between military capability and doctrine. Finally, a focus upon strategic aerial reconnaissance raises questions of ends and means: did reconnaissance aircraft merely serve as a tool of war planners or did strategic reconnaissance actually shape military strategy?

Traditionally, aerial reconnaissance played a secondary role in the minds of military planners and the public. Although the airplane's ability to provide

¹ Joint Chiefs of Staff, JCS Pub. 1, *Department of Defense Dictionary of Military and Associated Terms (Incorporating the NATO and IADB Dictionaries)* (Washington, D. C.: U. S. Government Printing Office, 1984), p. 350.

² A number of widely read books explore other aspects of strategic intelligence including William E. Burrows, *Deep Black: Space Espionage and National Security* (New York: Random House, 1986), James Bamford, *The Puzzle Palace: A Report on NSA, America's Most Secret Agency* (Boston: Houghton Mifflin, 1982), Jeffrey Richelson, *American Espionage and the Soviet Target* (New York: William Morrow & Co., 1987) and Bradley F. Smith, *The Shadow Warriors: O.S.S. and the Origins of the C.I.A* (New York: Basic Books, 1983).

commanders "eyes in the air" led to the first military use of the new technology, the exploits of pursuit aircraft and fighter aces seized public attention. In addition, despite unique and vital information provided by reconnaissance aircraft during World War I, interwar air power theorists concentrated upon the use of aircraft in combat.

Following World War I, the long-range bomber became the primary strategic weapon and the focus of air power thinking. Drawing upon the well-publicized theories of Giulio Douhet, Hugh Trenchard, and "Billy" Mitchell, air power advocates within the United States advanced theories of strategic air warfare as the justification for Air Force independence. According to the theorists, air attacks upon enemy armed forces in the immediate vicinity of the battlefield constituted "tactical" air power; "strategic" air power attacked the industrial and economic sources of the enemy's armed strength. In bureaucratic battles for limited defense budgets, air leaders argued that strategic bombing represented a new way of war. Long-range strategic bombardment would destroy the "vital centers" of an enemy's political and economic structure. The combined effect of high explosives, incendiary bombs, and poison gas would destroy the enemy's capability to wage war and break his will to fight. Furthermore, the airplane's ability to bypass armies and navies rendered traditional services obsolete. Since future wars would commence with the clash of air armies, the Air Force represented the nation's new first line of defense.³

³ For further explanation of the development of American theories of strategic air warfare, see Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, rev. ed. (Maxwell Air Force Base, AL: Air University Press, 1989), David MacIsaac, *Strategic Bombing in World War Two: The Story of the United States Strategic Bombing Survey* (New York: Garland Publishing, 1976), Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington: Indiana University Press, 1964, 1975), or Wesley F. Craven and James L. Cate, eds. *The Army Air Forces in World War II* (Chicago: University of Chicago Press, 1948-1958), vol. 1: *Plans and Early Operations*, pp. 17-71.

By the late 1930s, the US Army Air Corps further refined strategic bombing theories to produce a doctrine based upon high-altitude, daylight, precision bombardment. The concept called for the destruction of the enemy's industrial base by the pinpoint bombing of a few carefully selected industrial choke points. Stressing economy of force and the destruction of the enemy's capacity to fight, precision bombardment doctrine downplayed attacks upon civilians and the enemy's will to wage war. By 1937, the US Army Air Corps assembled the means to implement its version of strategic air war: the Boeing B-17 Flying Fortress and the Norden Mark XV bomb site.⁴

To air power advocates, World War II represented the test of strategic air warfare. Despite pre-war theories, the Battle of Britain proved the effectiveness of air defense, especially, with the introduction of radar. Similarly, Germany's determined defense of the "Fatherland" showed that although the bomber may always get through, the cost could be prohibitive. The relative effectiveness of air defenses threatened strategic bombing theory. To protect its heavy bombers, Britain's Royal Air Force (RAF) abandoned daylight bombing in favor of night attack. Because of problems associated with navigation and target identification, the RAF gradually adopted a doctrine based upon "area bombing" of German cities aimed at destroying the enemy's morale, as well as physical capacity to wage war.⁵

The US Army Air Forces disagreed with the RAF concept. The USAAF pursued precision daylight bombing doctrine despite heavy losses. Fortunately, the introduction of the North American P-51 Mustang long-range escort fighter

⁴ Craven and Cate, *The Army Air Forces in World War II*, vol. 1, pp. 597-599; MacIsaac, *Strategic Bombing in World War Two*, pp. 6-10.

⁵ Sir Charles Webster and Noble Frankland, *The Strategic Air Offensive Against Germany 1939-1945* (London: Her Majesty's Stationery Office, 1961), vol. 1: *Preparation Parts 1, 2 and 3*, pp. 167-187.

in early 1944 provided relief. With air superiority gained by spring 1944 and increased numbers of heavy bombers, air leaders pointed to devastated German cities as proof of strategic bombing's effectiveness. At the end of the war, the United States Strategic Bombing Survey assessed the impact of the air campaign. In the summary volume of the European experience, the survey concluded, "Allied air power was decisive in the war in Western Europe."⁶ Meanwhile the assessment of the bombing campaign against Japan reinforced the view: ". . . no nation can long survive the free exploitation of air weapons over its homeland."⁷

The debate over strategic air power's effectiveness overshadowed advances in aerial reconnaissance during World War II. For the most part, the glamorous image of fighter pilots or intrepid bomber crews captured public attention, not their counterparts flying equally dangerous reconnaissance sorties. Nevertheless, military planners appreciated the tremendous advances in aerial intelligence that occurred during the war. By the war's end, aerial reconnaissance aircraft provided prompt battlefield intelligence for commanders (tactical intelligence) and information concerning the enemy's capacity to wage war (strategic intelligence). More than simply providing army commanders with information on enemy troop locations, aerial reconnaissance formed the

⁶ United States Strategic Bombing Survey, Summary Report (European War), September 30, 1945, p. 15 in David MacIsaac, ed. *The United States Strategic Bombing Survey*, vol. 1 (New York: Garland Publishing, 1976); Harry R. Borowski, *A Hollow Threat: Strategic Air Power and Containment Before Korea* (Westport, Conn.: Greenwood Press, 1982), p. 20.

⁷ United States Strategic Bombing Survey, Summary Report (Pacific War), July 1, 1949, p. 28 in MacIsaac, *The United States Strategic Bombing Survey*. For additional studies of the impact of strategic bombing in World War II see David MacIsaac, *Strategic Bombing in World War II: The Story of the United States Strategic Bombing Survey* (New York: Garland Publishing, 1976); Haywood S. Hansell, Jr., *The Strategic Air War Against Germany and Japan*, (Washington, D.C.: Office of Air Force History, 1986); David R. Mets, *Master of Airpower: General Carl A. Spaatz* (Novato, Ca.: Presidio Press, 1988); and Phillip S. Meilinger Hoyt S. Vandenberg: *The Life of a General* (Bloomington: Indiana University Press, 1989). On the other hand, Michael S. Sherry *The Rise of American Air Power: The Creation of Armageddon* (New Haven, Conn.: Yale University Press, 1987) critiques the morality and rationale behind the bombing campaigns.

cornerstone for the strategic air campaign. In particular, photographic reconnaissance surveyed potential targets allowing analysts to determine vital industries, to plot attack routes, and to assemble target folders for aircrews. In addition, post-strike sorties provided bomb damage assessment necessary for evaluating success.⁸

Adding to advances in photographic intelligence, World War II spawned a new form of warfare linked to science and the use of radio waves for communication and detection. Electronic warfare (also called EW) involves military actions to protect friendly use of electromagnetic energy and to deny its use to the enemy. At a basic level, electronic warfare consists of electronic countermeasures (ECM), which includes jamming enemy transmissions and electronic counter-countermeasures designed to protect one's own transmissions from enemy jamming. Electronic intelligence (ELINT) seeks to collect information concerning the technical details of enemy radar and communications systems to either exploit their use or design electronic countermeasures to jam the systems. Normally ELINT refers to efforts to learn about enemy radar systems, but COMINT, or communications intelligence, focuses upon the interception and exploitation of enemy radio communications. The famed ULTRA secret of World War II serves as the premier example of a

⁸ For a detailed look at photo reconnaissance read C. Babington Smith, *Evidence in Camera: The Story of Photographic Intelligence in World War II* (London: Chatto and Windus, 1958) and Peter Mead, *The Eye in the Air: History of Air Observation and Reconnaissance for the Army, 1785-1945* (London: Her Majesty's Stationery Office, 1983).

successful COMINT program.⁹ On the other hand, the Allies modified aircraft to collect ELINT. Known as "Ferrets," these electronic reconnaissance aircraft carried special equipment to detect and analyze enemy radar signals.

Radar works on the principle of echoes. Just as it takes a certain amount of time for a voice echo to return after shouting, it takes a short amount of time for radio waves to return after they bounce off an object. A radar (originally an acronym for Radio Detection And Ranging) measures this time and determines the distance of the object. In other words, a radar station is a two-way radio system that includes a transmitter and a receiver. The transmitter sends out short pulses of high-frequency radio waves and the receiver detects the echoes of the waves after they have bounced off a target. The time between transmitted pulse and received echo is converted into the distance of the object. Since the echo returns with far less energy than originally transmitted, an amplifier works with the receiver and the results are projected upon an oscilloscope. Because the whole process occurs in fractions of a second, the oscilloscope, or radar screen, presents a continuous picture.

The primary purpose of electronic reconnaissance, or Ferret, aircraft centers on locating enemy radar stations and analyzing the performance characteristics of the set. The Ferret uses radar intercept receivers to detect enemy radar transmissions and a pulse analyzer to display the radio waves

* Perhaps the best surveys of electronic warfare may be found in Alfred Price, *Instruments of Darkness* (Los Altos, Ca.: Peninsula Publishing, 1987) and *The History of US Electronic Warfare* 2 vols. (Alexandria, Va.: Association of Old Crows, 1989). On the other hand, F.W. Winterbotham, *The Ultra Secret* (New York: Harper & Row, 1974), Ronald Lewin, *Ultra Goes to War* (New York: McGraw-Hill, 1978) and David Kahn, *The Codebreakers* (New York: Macmillan, 1974) represent the many books on communications intelligence during World War II. In addition, F. H. Hinsley, *British Intelligence in the Second World War*, 4 vols. (London: Her Majesty's Stationery Office, 1979-1988) provides a marvelous synthesis of the impact of various intelligence operations and R. V. Jones, *Most Secret War* (London: Hamish Hamilton, 1978) offers a personal account of the role of the scientist in intelligence and electronic warfare. Unfortunately, for the most part, COMINT activities in the postwar period remain highly classified. As a result, I will not discuss COMINT in this study.

received upon an oscilloscope for analysis. The Ferret operator (called radar observer, Radio Countermeasures (RCM) Officer, Electronic Warfare (EWO) Officer, "Raven," or "Crow" at various times) seeks performance characteristics that identify the function of a radar. Additionally, Ferrets record new electronic signals that allow analysts to track enemy technical progress.¹⁰

Overshadowing electronic warfare, the advent of atomic weapons in 1945 transformed warfare. In the mind of air power theorists, the atomic bomb fulfilled the terrible promise of strategic air warfare. For many others, the prospect of atomic Armageddon raised fundamental moral questions. As a result, the atomic age focused debate on nuclear strategy, deterrence, and the ethics of war.¹¹ In contrast, despite the emergence of national security affairs as a field of study, few historians have examined the capability of the United States to wage strategic air warfare with atomic weapons during the early years of the Cold War. Harry R. Borowski provides a notable exception. In *A Hollow Threat: Strategic Air Power and Containment Before Korea*, he argues that the Strategic Air Command (SAC), America's primary instrument for waging atomic warfare, was incapable of implementing strategic bombing doctrine. Inadequate manpower, equipment, and training rendered SAC "a hollow threat." Moreover, in "The Origins of Overkill," "American Atomic Strategy and the Hydrogen Bomb Decision," and other articles, David Alan Rosenberg reveals the limited size and capabilities of America's nuclear stockpile.

¹⁰ For further explanation of radar performance characteristics and Ferret operations see Appendix A. Navy Department, Office of the Chief of Naval Operations, *Radar Bulletin No. 12 (RADTWELVE): Airborne Radar Countermeasures Operator's Manual*, 8 April 1946, File 32c: CPT L. Heron, Association of Old Crows Archive, The Association of Old Crows, Alexandria, Virginia (hereafter abbreviated AOC).

¹¹ For a survey of the issues and significant theories see Lawrence Freedman *The Evolution of Nuclear Strategy*, 2nd ed. (New York: St. Martin's Press, 1989) while Gregg Herken *The Winning Weapon: The Atomic Bomb in the Cold War 1945-1950* (New York: Alfred A. Knopf, 1980) critiques American reliance on nuclear weapons in the immediate postwar era.

Although it would expand exponentially, America's atomic arsenal proved inadequate for fulfilling the initial war plans of the Joint Chiefs of Staff. Nevertheless, even if SAC possessed adequate planes, well-trained crews, and sufficient atomic bombs, could the United States wage strategic air war based on precision bombardment doctrine? Did US war planners know the locations of enemy targets and the capabilities of Soviet defenses?

A closer look at American war plans reveals a lack of intelligence data that jeopardized US strategic air war doctrine. Without target information, air planners could not determine the enemy's vital centers. In addition, without knowledge of Soviet radars, jet fighters, and anti-aircraft artillery, unescorted bombers faced perils potentially worse than those faced by the Eighth Air Force against Germany. Given the technological limitations of strategic bombers of the immediate postwar period (1945-1953) and the limited US nuclear stockpile, strategic aerial reconnaissance becomes a key to the success of strategic air warfare. Given the Air Force's reluctance to admit such a dilemma, "a need to know" dominates war planning in the initial years of the Cold War. Therefore, while most scholars concentrate upon the theoretical and moral issues raised by atomic warfare in the postwar period, this study will focus upon the impact of aerial reconnaissance upon America's capability for strategic air war.

American experiences in the Korean War revealed the limits of American reconnaissance capabilities and demonstrated the impact of intelligence flaws upon war planning. Viewed as a prelude to a general war, the invasion of Korea spurred the development of Air Force strategic aerial reconnaissance. The war strained the technological and manpower resources of the Air Force and revealed significant flaws in aircraft performance, organizational structure,

and analytical ability. During the conflict, Air Force electronic reconnaissance capabilities increased exponentially with the creation of a world-wide strategic reconnaissance program. Despite efforts to collect ELINT along the periphery of Communist nations, the United States still lacked the technology to gather intelligence from the Soviet heartland. The Air Force lacked aircraft capable of conducting strategic photographic reconnaissance over Soviet territory. Without sufficient aerial reconnaissance, American planners could not confirm Soviet atomic capability, assess new technology, or complete target planning.

Between 1945 and 1953, a lack of strategic intelligence caused by the limits of aerial reconnaissance shaped US war plans. By failing to provide sufficient information needed by a precision bombardment campaign, war planners resorted to urban area bombing using atomic weapons. Unable to target specific enemy war-making industries, JCS war plans called for bombing Soviet cities in an effort to destroy the enemy's capacity and will to wage war. Therefore, aerial reconnaissance was more than a tool of the war planners, the limits of strategic aerial reconnaissance shaped strategic doctrine.

CHAPTER I

THE ORIGINS OF AERIAL RECONNAISSANCE

Now in those days the tribe of Dan was in search of a territory to live in, because up till then no territory had fallen to them among the tribes of Israel. From their clan the Danites sent five brave men from Zorah and Eshtaol to reconnoitre the country and explore it.

Judges 18:2

The quest for military information predates recorded history. From before Biblical times, men conducted reconnaissance whether as hunters, explorers, or as warriors. The concept of reconnaissance, "an exploratory or preliminary survey, inspection, or examination to gain information," offered advantages in gaining surprise or to exploit terrain that seem obvious today.¹ In fact, reconnaissance appears so basic that studies of military history often ignore the subject. Furthermore, although poor reconnaissance may lead to military disaster, successful reconnaissance seldom assures victory. Most often, good reconnaissance provides the commander an edge that may combine with other important advantages in numbers, equipment, training, or doctrine to defeat an enemy.² Yet, good reconnaissance may lead to strategic or tactical surprise. In Western warfare, some military thinkers rank surprise next to numerical

¹ Philip Babcock, ed. in chief, *Webster's Third New International Dictionary of the English Language Unabridged* (Springfield, Mass.: G. & C. Merriam Co., 1981), p. 1897.

² Peter Mead, *The Eye in the Air: History of Air Observation and Reconnaissance for the Army* (London: Her Majesty's Stationery Office, 1983), p. 5.

superiority as an essential condition of battlefield success. According to the nineteenth-century Prussian theorist Carl von Clausewitz, the desire to achieve surprise is basic to all operations, for without it superiority at the decisive point is hardly conceivable.³ Moreover, Eastern traditions of war perhaps emphasize surprise to an even greater extent as shown by the writings of Sun Tzu:

Attack where he is unprepared; Sally out when he does not expect you. . .
Appear at places to which he must hasten; move swiftly where he does not expect you.⁴

Therefore, although relatively unstudied as a separate entity, reconnaissance serves as a means of gaining surprise and for guarding against enemy surprise.

The advent of manned flight offered revolutionary potential for reconnaissance. Two days after Joseph-Michel and Etienne-Jacques de Montgolfier introduced the first practical hot air balloon in September 1783, Andre-Giroud de Villette ascended in the craft. He recognized the enormous military potential of aviation:

From that moment I was convinced that this apparatus, at little cost, could be made very useful to an army for discovering the position of its enemy, its movements, its advances, its dispositions, and that this information could be conveyed by a system of signals, to the troops looking after the apparatus.⁵

Despite de Villette's foresight, the balloon did not immediately transform warfare. By the time of the American Civil War, although both Union and Confederate armies employed a small number of observation balloons, the invention achieved mixed results. The Federal army planned to use the invention as early as the First Battle of Bull Run; however, strong winds

³ Carl von Clausewitz, *On War*, ed. and trans. by Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), p. 198.

⁴ Sun Tzu, *The Art of War*, trans. and introduction by Samuel B. Griffith, Paperback ed. (London: Oxford University Press, 1971), p. 69 & p. 96.

⁵ Quoted in Mead, *Eye in the Air*, p. 11.

slammed the balloon against a telegraph pole and ripped it. Nevertheless, on June 18, 1861, Thaddeus S. C. Lowe sent an observation report to President Abraham Lincoln from his balloon *Enterprise*. During the Peninsula campaign of 1862, the Union army developed techniques for artillery spotting and actually linked air-to-ground telegraph lines. Despite aviation's promise, the US Army considered the device expensive, unwieldy, and unreliable.⁶ By the Franco-Prussian War of 1870-1871, the French deployed balloons in a desperate attempt to overcome the siege of Paris. During the struggle, balloons conveyed 164 persons, 381 carrier pigeons, five dogs and 3,000,000 letters past the Prussian lines surrounding the city.⁷ Although a reconnaissance balloon discovered a crucial trail used by American troops during the Battle of San Juan Hill of the Spanish-American War, the limitations posed by weather, frail construction, and primitive communications equipment relegated aviation to a novelty status.

The airplane provided the speed, range, and freedom of maneuver needed to transform aviation from a toy into a tool of war. In 1911, the Italians first used aircraft for military reconnaissance when they observed Turkish positions in Libya. In this brief campaign, Italian aeronauts furthered the military potential of aviation by taking aerial photographs, experimenting with wireless communications, and by dropping bombs.⁸ Likewise, the French, Mexicans, Bulgarians, and Turks used aircraft in various wars between 1912-1913. The United States first flew visual reconnaissance missions in 1913 in the Philippines and along the Mexican border, and Brigadier General John J. Pershing's celebrated pursuit of Pancho Villa in the spring of 1916 introduced

⁶ Glenn B. Infield, *Unarmed and Unafraid* (New York: Macmillan, 1970), pp. 22-24; Mead, *Eye in the Air*, pp. 16-17.

⁷ Mead, *Eye in the Air*, p. 18.

⁸ Lee Kennett, *The First Air War, 1914-1918* (New York: Free Press, 1991), p. 18.

the potential of air observation to the American public.⁹ Despite these accomplishments, the dynamic events of the First World War acted as the primary catalyst for all fields of military aviation.

During the epic struggle along the Western Front, aerial reconnaissance provided the most important use of the new weapon. For example, the Royal Flying Corps (RFC) tracked the advance of German armies before the crucial Battle of the Marne in August 1914 and discovered a critical gap in the enemy's line. As a result, the Allies successfully counterattacked and saved Paris. In his dispatch following the battle, General Sir John French lauded the exploits of the airmen: "Their skill, energy and perseverance have been beyond all praise. They have furnished me with the most complete and accurate information, which has been of incalculable value in the conduct of operations."¹⁰ The airplane also proved its value by spotting the fire of artillery. As early as September 1914, British airborne artillery observers sent their reports by wireless.¹¹ When the German and Allied armies ground to a halt in the morass of trench warfare, the airplane offered the best means to gather tactical intelligence. With cavalry unable to penetrate the trench barrier and enemy troops living underground in vast trench and bunker complexes, aircraft scanned the roads and railways behind the trenches for evidence of enemy build-ups or troop withdrawals. The introduction of air photography in January 1915 allowed photographic interpreters to analyze long-term trends and subtle changes in enemy dispositions. By the Battle of Neuve Chapelle in March 1915, the Allies had photographed the German trench system and transformed the information into detailed maps. Thus, the airplane proved useful for all

⁹ William E. Burrows, *Deep Black: Space Espionage and National Security* (New York: Random House, 1986), p. 32; Infield, *Unarmed and Unafraid*, pp. 31-32.

¹⁰ Mead, *Eye in the Air*, pp. 56-57.

¹¹ Ibid., pp. 66-67.

aspects of tactical reconnaissance.¹² According to Sir Walter Raleigh, the official British historian of the air war, "Reconnaissance, or observation can never be superseded; knowledge comes before power; and the air is first of all a place to see from."¹³

Efforts of the combatants to deny aerial reconnaissance to the enemy reinforced the importance of air observation. Tradition celebrates the evolution of fighter planes from individual airmen firing pistols and rifles to hazardous experiments where pilots fired machine guns and risked cutting their own propeller. Although the real beginning of aerial combat is difficult to define, the introduction of the German *Fokker Eindecker E1* in 1915 increased the lethality of air war. With a synchronization mechanism that permitted a machine gun to fire through the propeller arc, the *Fokker* drove French and British reconnaissance planes from the skies.¹⁴ From this point, the combatants devoted considerable energy and resources to gaining air superiority. Despite the notoriety achieved by fighter aces and the potential for air-to-ground combat demonstrated in bombing and strafing runs, aerial reconnaissance remained the dominant mission. Air forces sought to provide their armies all-important artillery spotting and intelligence information and to deny these benefits to the enemy.

Although the Battle of the Somme represented trench warfare's futility and slaughter, the campaign served as a milestone in aerial combat. In this¹⁵ Strategic reconnaissance refers to gathering information required for the formation of policy and military plans at national and international levels, whereas tactical air reconnaissance seeks information concerning terrain, weather, the disposition and movement of enemy forces, and artillery adjustment. In other words, strategic and tactical intelligence differ primarily in levels of application, scope, and detail. Department of Defense, JCS Pub 1: *Dictionary of Military and Associated Terms (Incorporating the NATO and IADB Dictionaries)* (Washington, D. C.: Joint Chiefs of Staff, 1 April 1984), p. 350 & p. 361.

¹² Mead, *Eye in the Air*, pp. 69-70.

¹³ See Lee Kennett's *The First Air War 1914-1918* for a good survey of aviation developments during the early years of the war.

battle, control of the air played a direct role in the outcome of the land battle. Beginning in late 1915, the German Air Force and the Royal Flying Corps battled for air supremacy over the fields of Flanders. At stake was the ability to adjust artillery fire and to observe infantry in the battle zone. With an initial technological edge provided by the *Fokker*, German reconnaissance crews spotted British preparations for the summer offensive of July 1916.¹⁵ Later, as the armies locked in horrific struggle, the air forces introduced new aircraft and tactics in the skies over the battlefield. Although air supremacy proved a vital prerequisite and the jousts of air aces gained public attention, the critical mission remained aerial reconnaissance. When the Germans held air superiority, British artillery lagged in effectiveness. Similarly, when the Royal Flying Corps eroded the German air arm with new aircraft and tactics, British guns terrorized enemy trenches. During the course of the battle, British reconnaissance planes registered 8,612 artillery targets and processed 19,000 aerial photographs which were used to mark terrain features of critical importance in trench warfare.¹⁶ Thus, although air historians emphasize the Somme air campaign for developments in air combat, the link of air superiority, reconnaissance, and artillery effectiveness remained the most significant relationship.

By the end of the World War I, aerial combat emerged as a legitimate instrument of war. Technological advances transformed airplanes from rickety contraptions to serious weapons. The battles for air supremacy played a vital role in developing the technology of air warfare and introduced the "intrepid airman" as a new breed of hero. However, the Great War played an equally important, although less heralded, role in developing the art of aerial

¹⁵ Kennett, *First Air War*, p. 36

¹⁶ Mead, *Eye in the Air*, p. 82.

reconnaissance. By 1918, reconnaissance planes and observer balloons provided commanders with vertical and oblique aerial photographs which enabled staffs to map terrain, mark enemy troop positions, spot artillery, and to anticipate attack.¹⁷ Advances in wireless communications enabled air observers to adjust artillery fire to counter enemy guns. Moreover, the volume of aerial reconnaissance increased prodigiously. By the end of the 1917, German reconnaissance planes produced nearly four thousand photographs per day and covered the entire western front every two weeks.¹⁸ In addition, by the end of the war, the American air service claimed aerial photographs were handled so efficiently that only twenty minutes elapsed from the time a photo was taken to its use by artillery batteries.¹⁹ As a result of technological and organizational innovations during the First World War, aerial reconnaissance emerged as an indispensable means of gaining tactical intelligence.

The success of military aviation during the First World War launched a bitter debate over its future. In the spring of 1919, two manuals summarized the official US Army view, ". . . in the future, as in the past, the final decision in war must be made by men on the ground, willing to come hand-to-hand with the enemy. When the Infantry loses the Army loses. It is therefore the role of the Air Service, as well as that of other arms, to aid the chief combatant the Infantry." In addition, the traditional view enhanced the position of aerial reconnaissance, "the greatest value of the Air Service to date has been in gathering information of the enemy and of our own troops."²⁰ Pursuit, or fighter, aircraft served

¹⁷ Vertical photographs referred to those taken from directly overhead, while oblique photos used a camera inclined to the earth's surface to produce a panoramic view. Infield, *Unarmed and Unafraid*, pp. 35-36; Kennett, *First Air War*, p. 37.

¹⁸ Burrows, *Deep Black*, pp. 33-34.

¹⁹ Ibid., p. 36.

²⁰ Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, Vol. I: 1907-1960* (Maxwell Air Force Base, AL: Air University Press, 1989), p. 29.

primarily to protect friendly observation aircraft and to prevent enemy reconnaissance. Aircraft designed for long-range bombing of enemy industrial centers remained a "luxury."²¹

In contrast to this limited vision of aviation, an international band of air power theorists emphasized strategic bombardment. Led by Britain's Hugh Trenchard, Italy's Giulio Douhet, and America's William "Billy" Mitchell, these air enthusiasts considered air power to be a new, war-winning weapon that rendered armies and navies obsolete. Popularized by numerous speeches, articles, and books, including Douhet's *Command of the Air* (1921) and Mitchell's *Winged Defense* (1925), air power prophets proclaimed the airplane's dominance of war. The airplane could strike directly the enemy's capacity and will to wage war. By destroying the enemy's "vital centers," air power would bypass traditional armies and navies. Moreover, the unique offensive characteristics of the airplane made air defense nearly impossible. Theorists believed the best defense against an enemy air force was to destroy it on the ground.²² Consequently, because air power represented a unique, new weapon, airmen sought organizational independence from ground and naval forces.

In their polemical writings, Douhet, Mitchell, and others failed to grasp a fundamental flaw of strategic bombardment theory. During the interwar years, air theorists assumed complete knowledge of the enemy's vital centers. Mitchell and Douhet understood the need for reconnaissance, but air power

²¹ Ibid., p. 28.

²² For summaries of air power theory following World War I see Futrell, *Ideas, Concepts, Weapons*, pp. 22-39 and MacIsaac, *Strategic Bombing in World War Two*, pp. 4-10. Also for reprints of early air power theorists see William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power -- Economic and Military* (Port Washington, N.Y.: Kennikat Press, 1971) and Giulio Douhet, *The Command of the Air*, reprint ed. (Washington, D.C.: Office of Air Force History, 1983).

proponents underestimated the difficulties involved in obtaining air intelligence. For example, Giulio Douhet proposed an ideal reconnaissance plane that featured superior speed and long range even at the cost of defensive armor and armament.²³ Although he showed prescience regarding reconnaissance aircraft, Douhet failed to recognize the need for maps, cameras, specialized equipment for photo analysis, and sophisticated organizations to process and assess information. Along similar lines, although the US Army Air Corps Tactical School refined the concept of precision, daylight bombardment, it failed to think through the problems associated with strategic aerial reconnaissance. Instead, the Air Corps thinkers stressed bomber development and theoretical analyses of industrial choke points. They failed to study sufficiently the need for pre-strike surveillance and post-strike damage assessment. Furthermore, to many airmen, reconnaissance symbolized the shackles of ground force control. As a result, air reconnaissance occupied a position of secondary importance within the Air Corps. Interwar reconnaissance training still stressed artillery spotting and First World War observation techniques. By the eve of World War II, aerial reconnaissance remained little advanced from the techniques and concepts of World War I.²⁴

Although the conceptual thinking behind strategic aerial reconnaissance lagged, technological improvements occurred during the interwar years. Head of Army Air Corps photographic research, Captain George W. Goddard introduced new cameras for photo reconnaissance and mapping, plans for specialized reconnaissance aircraft, portable film processing laboratories, and

²³ Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (New York: Coward-McCann, 1942), pp. 120-121.

²⁴ Craven and Cate, *The Army Air Forces in World War II*, pp. 615-616.

ideas for infrared and long-range photography.²⁵ He further stressed peacetime aerial mapping. Goddard recognized that a lack of adequate maps and charts not only hindered the development of civilian airlines, but also suggested problems for long-range bombers. Therefore, he introduced a trimetrogon camera that utilized three lenses to take vertical and oblique pictures to either side of the aircraft simultaneously. These lenses broadened the camera's field of view to near horizon-to-horizon coverage.²⁶ Goddard demonstrated the value of his developments when the Army Air Corps staged a flight of ten Martin B-10 bombers from Washington, DC to Fairbanks, Alaska in July 1934. Although the mission was designed primarily to showcase the potential of long-range air power, the planes also mapped 20,000 square miles of Alaskan territory with Goddard's new cameras.²⁷ Therefore, by the eve of World War II, technological advances increased the effectiveness of aerial photography, even though ideas for operational employment remained stagnant.

World War II provided a test for air power theory as well as technology. Early British efforts at "strategic" bombing revealed that the bomber "would not always get through." From the initial Royal Air Force sorties against Wilhelmshaven in 1939 to the fall of France in 1940, British bomber raids suffered unacceptable losses to German fighter defenses. Well-armed, high-performance fighters refuted the assumption of bomber omnipotence. In response, the RAF developed a doctrine of night area bombardment that

²⁵ Assigned to aerial photographic work in 1918 as a second lieutenant, Goddard worked on aerial photography during most of the interwar period. He advanced in rank from lieutenant to major in various positions. Before World War II, he served as head of the Air Corps Photographic Section. *Infield, Unarmed and Unafraid*, p. 53.

²⁶ Burrows, *Deep Black*, p. 38.

²⁷ The Alaskan project also demonstrated the problems of cold-weather photography. *Infield, Unarmed and Unafraid*, p. 58.

recognized operational limits. Because existing technology could not provide accuracy suitable for precision bombing at night, RAF Bomber Command emphasized attacks on German cities to crush morale and destroy the homes of the enemy's industrial work force. Area bombing as practiced by Air Marshal Sir Arthur Harris, commander of RAF Bomber Command, resisted the appeal of selective, or "panacea," targets. Incapable of pinpoint bombing, RAF area strikes also required less accurate intelligence.²⁸

The European air war also demonstrated the difficulty of conducting aerial reconnaissance. At the beginning of the war, confidence in existing reconnaissance procedures vanished when photo reconnaissance Blenheims were shot down at alarming rates and frozen cameras, fogged lenses, and cracked film ruined the valiant efforts of surviving pilots.²⁹ The dismal results forced the British Air Ministry to revamp reconnaissance methods.

Despite initial failures, the RAF pioneered the concepts, equipment, and tactics of modern strategic photographic intelligence. Beginning as a civilian before the war, Frederick Sidney Cotton developed a new approach to aerial reconnaissance:

The best method appears to be the use of a single small machine, relying on its speed, climb, and ceiling to avoid destruction. A machine such as a single-seat fighter could fly high enough to be well above Ack-Ack fire and could rely upon sheer speed and height to get away from the enemy fighters. It would have no use for armament or radio and these could be removed to provide room for extra fuel, in order to get the necessary range. It would be a very small machine painted so as to reduce its visibility against the sky.³⁰

²⁸ Webster and Frankland, *The Strategic Air Offensive Against Germany 1939-1945*, vol. 1, pp. 349-350.

²⁹ Notice the similarity to Douhet's ideal reconnaissance aircraft. Constance Babbington Smith, *Evidence in Camera: The Story of Photographic Intelligence in World War II* (London: Chatto and Windus, 1958), p. 25.

³⁰ Ibid., p. 32

During the first two years of the war, Cotton's exploits with a stripped-down, polished Supermarine Spitfire assumed legendary proportions as he gained information unobtainable by other sources. Moreover, technicians at the RAF's Photographic Reconnaissance Unit developed high-altitude cameras with a 36-inch focal length that produced high-quality photographs with clear resolution. Equally important, the British Air Ministry recruited talented, highly motivated individuals from a broad range of civilian occupations to serve as photographic interpreters. By refining the equipment, techniques, and methodology of this seemingly mundane field, the RAF furthered the processing and analysis of data gathered by reconnaissance crews.³¹ Finally, throughout the war, the British understood the importance of centralization and coordination of intelligence data. Efforts to streamline the processing of intelligence information furthered the proper analysis of data and the use of information by field commanders.³²

The entry of the USAAF into the European air war proved the inadequacy of pre-war reconnaissance concepts and training. After a poor showing in the initial phase of North African operations, the AAF reorganized observation units along the lines of RAF tactical reconnaissance.³³ Like their British counterparts,

³¹ In her book, *Evidence in Camera*, Constance Babington Smith showed that a sexist assumption paid great dividends for British intelligence. Reasoning that photo interpretation required long hours of effort, tremendous patience, and attention to detail -- the same attributes of sewing, the Royal Air Force recruited women to serve as photo interpreters. Judging from Babington Smith's firsthand tales of inspired deduction that resulted from painstaking effort, successful results justified the RAF decision. *Ibid.* p. 66.

³² In *British Intelligence in the Second World War*, F. H. Hinsley emphasizes the organizational efforts to create a comprehensive, rational method for the entire intelligence process. By analyzing the spectrum of activities associated with the intelligence cycle, the British enhanced the quality and timeliness of intelligence information. In other words, they not only improved intelligence collection, but the processing of data, analysis, coordination, and dissemination of information. F. H. Hinsley, *British Intelligence in the Second World War*, 4 volumes (London: Her Majesty's Stationery Office, 1929-1988).

³³ Wesley F. Craven and James L. Cate, eds. *The Army Air Forces in World War II*. 7 vols. (Chicago: University of Chicago Press, 1948-1958), Vol. 6: *Men and Planes*, p. 617.

Americans learned from bitter experience the value of aircraft with altitude, speed, and range characteristics superior to enemy interceptors. The lack of aircraft specifically designed for aerial reconnaissance plagued American reconnaissance efforts. Eventually, the USAAF paralleled British efforts when American pilots flew modified Lockheed P-38 Lightnings and North American P-51 Mustangs to support the USAAF's daylight strategic bombardment campaign. The German introduction of Me-262 jet fighters during the latter stages of the war menaced Allied photo reconnaissance aircraft. Fortunately, the Allies possessed an overwhelming numerical advantage that allowed the Combined Bomber Offensive to continue. Although American reconnaissance groups performed valiantly, they added little to RAF photo reconnaissance concepts.³⁴

Apart from British advances in strategic photographic intelligence, RAF performance in the Battle of Britain demonstrated the capability of aerial defense. Combining communications intelligence with new radar technology, by 1940 the Royal Air Force developed a practical network of Early Warning (EW) and Ground Controlled Intercept (GCI) stations which notified fighter bases of enemy aircraft approach and directed fighters to intercept the enemy. Although many factors contributed to the defeat of the *Luftwaffe* in the Battle of Britain, British technology played a vital role.³⁵ Radar refuted earlier assumptions that bombers could attack without warning. By the summer of 1940, the Germans introduced a radio-aided navigational device, known as

³⁴ Craven and Cate, *The Army Air Forces in World War II*, vol. 6, pp. 221-223; Infield, *Unarmed and Unafraid*, p. 80-99.

³⁵ Operational errors, poor target selection, and the misuse of an air force designed primarily for tactical air support to wage a strategic bombing campaign also contributed to the German loss in the Battle of Britain. For further details see R. J. Overy, *The Air War 1939-1945*, paperback ed. (New York: Stein and Day, 1985), pp. 98-108 and Williamson Murray, *Luftwaffe* (Baltimore: Nautical & Aviation Publishing Co., 1985), pp. 43-61.

Knickebein, to improve night bombing accuracy. British efforts to counter it resulted in the "Battle of the Beams."³⁶ By the winter of 1943, electronic warfare played a critical role in RAF night bombing. In support of their night area bombing campaign, the British developed navigation aids (including GEE and OBOE), H2S airborne radar, and radar countermeasures (WINDOW and various electronic devices). The Germans countered with nightfighters, SN2 airborne intercept radar, and a variety of passive radar detection devices. The combination of a German technological breakthrough and innovative nightfighter tactics caused major RAF losses in the Battle of Berlin (November 1943 - March 1944) and almost defeated the RAF night bombing campaign.³⁷ These events emphasized the growing importance of electronic warfare during World War II. Combatants now needed information about the enemy's electronic defenses in order to plan successful strikes.

Although Germany and Britain played the leading role in developing electronic warfare, the United States contributed in the specialized field of airborne electronics intelligence (ELINT). Even though the RAF introduced ELINT-equipped Wellington bombers in 1942, the United States assumed the lead in electronics reconnaissance with the introduction of specialized electronics reconnaissance (nicknamed "Ferret") aircraft the following year. To accomplish this feat, the United States mobilized scientific talent and harnessed the production capacity of its vast electronics industry. At the heart of the American electronic warfare effort, the Office of Scientific Research and Development selected Dr. Frederick E. Terman from Stanford University to head

the Radio Research Laboratory responsible for radio and radar

³⁶ R V Jones, *Most Secret War* (London: Hamish Hamilton, 1978), pp 92-100

³⁷ Sir Charles Webster and Noble Frankland, *The Strategic Air Offensive Against Germany 1939-1945*, 3 vols (London: Her Majesty's Stationery Office, 1961), Vol 2: *Endeavor Part 4*, pp 190-211

countermeasures. In a shrewd organizational move, the National Defense Research Committee kept Terman's Division 15 independent from Division 14 created to advance radar.³⁸ Hence, there was no bureaucratic pressure from radar proponents to retard radar countermeasures (RCM) development. Therefore, the Radio Research Laboratory (RRL) moved quickly to develop the components necessary for electronic reconnaissance and radar jamming. For example, in early 1942, Terman directed the adaptation of SCR 587 radar intercept receivers for airborne use.³⁹ This equipment allowed aircraft to identify enemy radar sites and to determine their operating characteristics.⁴⁰ In addition to its role in developing electronic countermeasures, the United States offered tremendous production capability to the Allied electronic warfare effort.

Dr. George Rappaport observed:

Once there was an operational requirement for it [the APR-2 Carpet jamming transmitter] the Army Air Force wanted 15,000 and I was sent to Delco at Kokomo, Indiana, to discuss the contract to mass produce it. Bert Schwarz, their brilliant chief production engineer, showed me around the plant. . . . As we walked around Bert looked rather unhappy and he kept scratching his head. In the end I said to him 'What's wrong, can't you build the 15,000 for us?' He paused for a while, then answered 'Well, 15,000 a week, that's an awfully tough rate . . .' I looked at him in amazement and told him I did not want 15,000 Carpets per week, 15,000 in a year would do fine. Bert broke out into a smile. 'Oh,' he said, 'I'll have to reduce my production capacity to do that!'⁴¹

³⁸ Interview, Colonel Hugh Winter, USAF (ret) by Frank Voltaggio and Alfred Price, August 29, 1980, p 1, File 47 Col. H. Winter, Association of Old Crows (AOC) Archive, Association of Old Crows Building, Alexandria, Virginia; Alfred Price, *The History of US Electronic Warfare*, Vol. I: "The Years of Innovation -- Beginnings to 1946" (Westford, Ma.: Murray Publishing Co., Association of Old Crows, 1984), pp. 21-22

³⁹ Interview, Dr. George Rappaport by Alfred Price and Armand J. Morin, Fall 1981, File 14, AOC Archive, Alexandria, Va.

⁴⁰ Eventually, the RRL introduced 150 new types of electronic warfare equipment. F. E. Terman, *Administrative History of the Radio Research Laboratory, Office of Scientific Research and Development, National Defense Research Committee, Division of Radio Coordination (15)*, March 26, 1946, Folder 1, Box 9, SC 160 Series 1, Frederick Emmons Terman Papers, Stanford University Library Archives, Stanford, California

⁴¹ Ibid., p 3

Before the United States could design and build jammers, the Army Air Force needed to understand the performance characteristics of enemy radar.⁴² In early 1942, the US Army Air Forces (USAAF) established a Radar School at Morrison Field, Florida. Moved to Boca Raton in June 1942, the Radar School developed an RCM (Radio Countermeasures) Course and trained specialists in radar detection, nicknamed "Ravens," for air operations. Initially training in antiquated Lockheed B-34 bombers, the Ravens operated radar search receivers and pulse analyzers to find radar transmissions and display them on oscilloscopes for analysis.⁴³ In addition, the RCM school taught the rudiments of electronic jamming and the use of WINDOW (also called chaff), small strips of aluminum foil scattered from an aircraft that masked the aircraft's image on a radarscope. Unfortunately, shortages of equipment and experience limited the school's effectiveness.⁴⁴ In the words of one participant, "The RCM course was a riot -- nobody was sure how anything (equipment) worked, if it worked nobody really knew why, and if it did what it was supposed to accomplish."⁴⁵ Since the Army Air Force acknowledged British expertise in the European Theater, the first American Ravens headed for the Pacific.⁴⁶

On March 6, 1943, Second Lieutenants Bill Praun and Ed Tietz flew the first American electronic reconnaissance flight against a Japanese radar on

⁴² With radar, "performance characteristics" refer to measurements of radiated electromagnetic energy used to determine the radar's function, range, and relative accuracy. For further details see Appendix A: Radar Principles.

⁴³ The nickname "Raven" derived from the codeword used for radar countermeasures at the time. By 1948, the abbreviation RCM was replaced by ECM (Electronic Countermeasures) and most Electronic Warfare Officers (EWO) were referred to as "Crows" (an American Raven). Winter, AOC 47, pp. 2-3 & p. 8.

⁴⁴ Winter, AOC 47, p. 5.

⁴⁵ Letter, Colonel Robert R. Perry, USAF (ret) to Alfred Price, 2 June 1982, p. 2. File 31 Col R. Perry,

AOC Archive, AOC Building, Alexandria, Virginia

⁴⁶ Winter, AOC 47, p. 5

Kiska Island in the Aleutian chain. Spotted by aerial photography, the Kiska radar afforded a unique opportunity to learn about Japanese equipment.

Knowing few details, American electronic analysts assumed Japanese radar technology to be inferior. Consequently, "Ferret I," a modified B-24D conducted a series of flights with varied success. Praun and Tietz received signals in the 100 megacycle (mc) range that suggested a Japanese Mark I Model 1s Early Warning Radar, but the new APR-4 search receivers provided only crude data.⁴⁷ Nevertheless, Ferret I blazed the trail for American electronic reconnaissance

With the Allied invasion of North Africa, the US Army Air Forces broadened the scope of Ferret activity. In May 1943, Ferret III entered service with the 16th Reconnaissance Squadron.⁴⁸ Later joined by Ferrets IV, V, and VI, the modified B-17s flew night, low-level missions into Axis radar coverage. Initially concentrating on Sicily, eventually the aircraft flew electronic reconnaissance missions over Sardinia, Corsica, Italy, and southern France.

(Figure 1) Between May 1943 and September 1944, the Mediterranean Ferrets flew 184 sorties and discovered 450 enemy radar sites. As a result of Ferret data, analysts learned the range and operating frequencies of German *Freya* early warning radar, *Gema* coastal surveillance radar, and *Wurzburg* ground-controlled intercept radar.⁴⁹ This information aided operational planning for amphibious assaults HUSKY, AVALANCHE, SHINGLE, and DRAGOON and the strategic bombing missions conducted by the 15th Air Force. In addition, the 16th Reconnaissance Squadron determined that the new American RC-156

⁴⁷ Winter, AOC 47, p. 6; Interview, Lieutenant Colonel Ingwald Haugen, USAF (ret) by Alfred Price and Frank Voltaggio, pp. 1-2, File 25: Col. I. Haugen, AOC Archive, AOC Building, Alexandria, Va., Price, *History of US Electronic Warfare*, pp. 52-53.

⁴⁸ Evidently Ferret II was a prototype and never deployed overseas. Ferrets III and IV were B-17s modified at Wright Field, near Dayton, Ohio. Winter, AOC 47, p. 7.

⁴⁹ Major Charles Eaton, "The Ferrets," (1947), pp. 1-2, File. No. Africa Ferrets, AOC Archive, AOC Building, Alexandria, Va., Winter, AOC 47, p. 10.

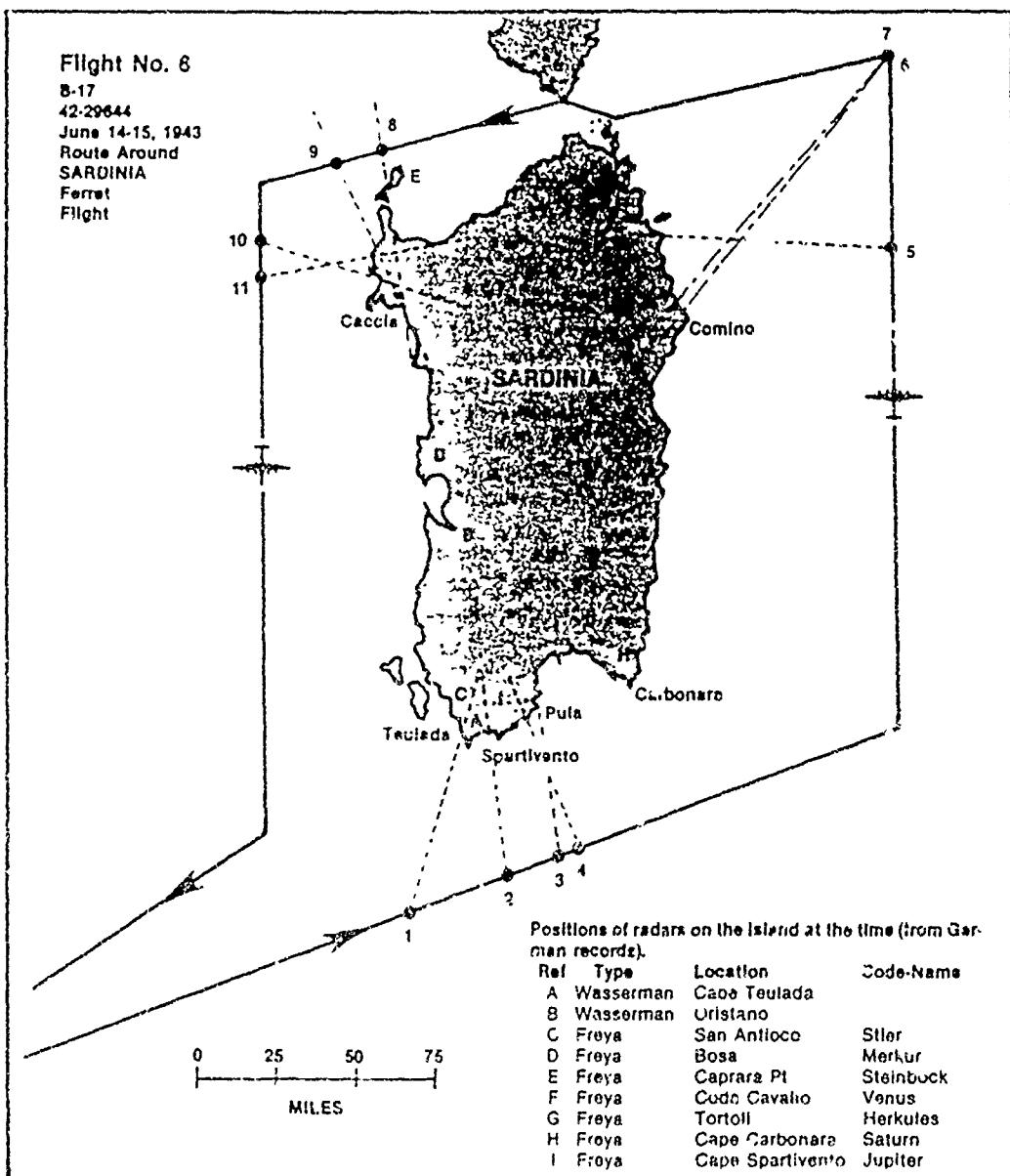


FIGURE 1
 Flight No. 6 of Ferret III, June 14-15, 1943.

Carpet electronic jammer offered protection for bombers against gun-laying radar (now called fire-control radar).⁵⁰ Finally, the ELINT B-17s improvised new Ferret tactics. American electronic reconnaissance aircraft accompanied RAF Wellington night bombers and established collection orbits during raids. On other occasions, crews braved night missions flying 200- to 500-feet over mountains --a most "unhealthy" practice -- in order to surprise German radar operators.⁵¹ The daring, often improvised, tactics of the 16th uncovered valuable information about enemy defensive systems. Thus, by fall 1944, USAAF Ferrets added a new dimension to strategic aerial reconnaissance.

In the Pacific Theater, US forces relied upon aerial reconnaissance to plan the strategic bombing offensive to perhaps an even greater extent than Europe. Lacking the benefit of an established British intelligence organization, the US strategic air campaign faced a dearth of strategic intelligence. To build target folders, the USAAF relied on strategic photo intelligence to determine basic economic and industrial data and aerial ELINT to form the Japanese electronic order of battle.⁵² Unlike Europe, the Allies lacked a pool of prewar information, a network of spies, and other sources of economic information. Furthermore, the vast distances, long supply lines, and relatively primitive conditions complicated operations and demanded a knack for ingenuity and improvisation.⁵³

⁵⁰ Originally the Carpet noise jammer was intended solely for use in amphibious assaults. Eaton, "The Ferrets," pp. 3-5

⁵¹ Ibid., p. 2.

⁵² In the spring of 1944, the USAAF's XXI Bomber Command lacked sufficient photographic reconnaissance to target its primary objective -- the Japanese aircraft industry. On November 1, 1944, an F-13A (a photo reconnaissance version of the B-29) provided enough photographs for the first series of missions. Haywood S. Hansell, *The Strategic Air War Against Germany and Japan* (Washington, D. C.: Office of Air Force History, 1986), p. 169 & p. 179.

⁵³ Although this study focuses upon strategic aerial reconnaissance and its impact upon strategic air warfare, interested readers should consult Alfred Price's *The History of US Electronic Warfare* for the extensive US Navy ELINT programs conducted in the Pacific.

The air war against Japan introduced the USAAF to night area bombing, but did not refute its belief in precision bombing. Desires to end the war quickly, avoid a costly ground invasion, and demonstrate air power's decisiveness influenced the planning.⁵⁴ The initial bombing campaign called for the destruction of the Japanese aircraft industry through precision bombardment. From November 1944 - March 1945, Boeing B-29 Superfortresses conducted daylight, high-altitude, precision strikes using tactics similar to the European air war. Unfortunately, chronic bad weather, extreme long range, maintenance problems, and inexperienced crews combined for disappointing results. Impatient with low bomb tonnages and the lack of measurable success, the USAAF switched to low-level, night area attacks.⁵⁵ Although the fire bombing of Japanese cities resulted in impressive, horrific destruction, AAF leaders viewed the Pacific strategic bombing campaign as a unique expedient. Air planners recognized the unusual vulnerability of Japanese cities to incendiary attack and many air leaders considered Japan a defeated nation in conventional terms. Night area bombing represented a move to break Japan's will to resist and to force surrender. Because of these unique conditions, the Pacific experience did not alter most airmen's conviction for the concept of precision bombing.⁵⁶

Although the need for ELINT remained significant, air leaders viewed strategic electronic reconnaissance operations in the Pacific as a secondary concern. The *ad hoc*, freewheeling nature of ELINT operations staged out of China reinforced this view. Apparently, Brigadier General Claire L. Chennault initiated the demand for ELINT within the USAAF when Japanese Zeros began

⁵⁴ Hansell, *The Strategic Air War Against Germany and Japan*, p. 159, p. 166, p. 177, & p. 213.

⁵⁵ The United States Strategic Bombing Survey, Summary Report (Pacific War), 1 July 1946, p. 16, in MacIsaac. *The United States Strategic Bombing Survey*, vol. 7; Hansell, *The Strategic Air War Against Germany and Japan*, p. 212.

⁵⁶ Hansell, *The Strategic Air War Against Germany and Japan*, pp. 217-257.

intercepting his fighter sweeps in mid-1944.⁵⁷ An early graduate of the RCM school, Lieutenant Robert Perry volunteered to lead the Ferret effort. With the aid of an officer assistant and two maintenance men, Perry outfitted a B-24 with ELINT gear and planned the first sortie:

What we needed to know was: are there any Jap radars over there? And if so, what kind are they and what kind of threat are they. So I planned the missions on that basis. . . .

To start, I planned to go where there was the biggest chance of finding a radar, to prove there were radars in the area. My pilot and I figured that the Hong Kong - Canton area was probably the most likely place . . .

We planned the first mission to go down to the Linchow Peninsular (sic), then to Canton and then home; a run of about 8 hours over enemy territory in darkness. We got over the Kowloon docks about 10 pm local time -- not a peep from our receivers. We were very disappointed. Lt Uthe (the pilot) felt that the Japs in Canton were fighting in a very civilized manner, and had probably gone to bed. So, he made a couple of low level passes over the Kowloon docks. Sure enough, by the time he leveled off from the second pass, we began to pick up radar signals loud and clear. We flew a couple of plotting runs and returned to Kunming.⁵⁸

Eventually, the Ferret B-24 flew missions to Formosa, the Pescadores, Hainan Island, and over most of Japanese-occupied China. By the time, the B-29 campaign began in earnest, Wright Field modified B-29s to serve in an RCM role. Each squadron received a B-29 equipped with receivers, a pulse analyzer, and preset jammers. Unfortunately, since the B-29 lacked a crew seat, the RCM operator sat on the airplane's toilet (a move considered painfully symbolic by later Air Force electronic warfare officers).⁵⁹

Although operational analysis proved the value of electronic reconnaissance and radar countermeasures, electronic warfare fought an uphill

⁵⁷ Letter, Perry to Price, AOC 31, p. 8.

⁵⁸ Ibid., pp. 6-7.

⁵⁹ Since bomber squadrons possessed few personnel trained for electronic warfare, a few specialists set the frequencies for aircraft jamming equipment before flight. Ibid., p. 5 & p. 7.

battle for acceptance. Unlike photographic intelligence, commanders and crews could not "see" the results of electronic countermeasures.⁶⁰ Electronic warfare represented a form of mysterious, technical wizardry understood by few. Most pilots objected to the weight and drag induced by electronic gear; they "didn't want any of that crap" on their airplanes.⁶¹ About the time ELINT data enabled scientists and engineers to design and build new jamming devices, other developments made electronic warfare less necessary. For example, the introduction of large numbers of long-range North American P-51 Mustang fighters gained Allied air superiority in February 1944. In addition, the Allied land offensive following the Normandy invasion reduced *Luftwaffe* radar sites and advanced fighter bases. Instead of jamming enemy early warning and GCI frequencies, Allied fighters wanted the Germans to launch planes so they could be shot down. Finally, as Allied numerical superiority mounted, the quantity of existing electronic jammers and WINDOW (chaff) overwhelmed German radars.⁶² Therefore, airborne electronic intelligence decreased in significance even as Ferret effectiveness increased. As a result, in November 1944, the 16th Reconnaissance Squadron became one of the first units decommissioned.⁶³

Of greater significance, electronic warfare and electronic reconnaissance failed to establish a permanent foothold in US Army Air Forces organization. As a hybrid of operational, research, and intelligence functions, airborne electronic reconnaissance failed to fit neatly into existing staff organizations. In the

⁶⁰ For this study, the terms "Electronic Countermeasures" (ECM) and "Radio Countermeasures" (RCM) are interchangeable. Contemporary documents followed this practice for the most part, although the official designation remained "Radio Countermeasures" until 1948.

⁶¹ Perry, AOC 31, p. 4. On more than one occasion, local commanders reconverted their specially modified ELINT aircraft back into standard bombers. They did not want "a lot of signals junk" loading down their planes. Haugen, AOC 25, p. 2.

⁶² Winter, AOC 47, p. 13.

⁶³ Frank Voltaggio, "Out in the Cold . . . : Early ELINT Activities of the Strategic Air Command," (unpublished, n. d.), File: Voltaggio, AOC Archives, AOC Building, Alexandria, Va.

European Theater, the USAAF balked at creating a separate a RCM organization.⁶⁴ Therefore, no single agency centralized and coordinated ELINT activity. Although Division 15 and the Radio Research Laboratory attempted to promote electronic warfare and headed research and development, civilians ran these organizations. As a result, they had little impact on AAF hierarchy. When the war ended, the proponents of electronic warfare returned to civilian life.⁶⁵ Thus, electronic reconnaissance lacked a "champion" to defend its organizational interests.

In summary, by the end of World War II, strategic aerial reconnaissance demonstrated its value in both the conduct of land battles and air campaigns. From the early days of flight, aviation promised advantages in gaining surprise. During the First World War, aerial photography proved vital in assessing enemy battlefield strength, planning operations, and adjusting artillery fire. By the end of the Combined Bomber Offensive in the Second World War, photographic intelligence from high-flying reconnaissance aircraft provided the foundation for strategic air warfare. Unfortunately, although electronic reconnaissance proved important for defeating enemy defensive systems, Ferret aircraft failed to earn the respect of commanders as an essential intelligence gathering system. With abundant forms of ground communications intelligence, photographs, and spy networks, ELINT remained a peripheral, "nice to have" source of information. Consequently, strategic aerial reconnaissance emerged from World War II with a mixed legacy. Commanders valued aerial photography as the indispensable

⁶⁴ Letter, O. G. Villard, Jr., O.S.R.D. - London Mission, to A. Earl Cullum, Jr., R.R.L., July 9, 1944, p. 2. File: Dr. O. Villard, AOC Archive, Alexandria, Va.

⁶⁵ From a wartime peak of 923 scientists, engineers, technicians, and administrative personnel, the RRL declined to 401 employees by December 1945 and to less than 25 by April 1946. All official research projects closed by January 1945. Personnel Distribution Weekly Lists, Folder 2, Box 3, SC 160 Series 1, Frederick Emmons Terman Papers, Stanford University Library Archives.

foundation of campaign planning, but electronic reconnaissance failed to convince leaders of its necessity.

CHAPTER II
GROPING IN THE DARK:
RECONNAISSANCE BEFORE CONTAINMENT, 1945-1946

Who controls the reconnaissance watches the enemy;
Who watches the enemy perceives the threat;
Who perceives the threat shapes the alternatives;
Who shapes the alternative determines the response;
William Burrows¹

Aerial reconnaissance failed to rank as a priority of American political and military leaders following World War II. Faced by broad challenges inherent in creating a "new world order," leaders concentrated their efforts on major domestic, international, and military issues of greater magnitude than establishing a capability for aerial surveillance. Demobilization and the economy were of prime importance to the American public and government officials. In addition, strained US-Soviet relations caused distress, although a bewildering array of international events called for attention. Finally, military professionals grappled with structuring national defense for a postwar world. From the end of World War II until President Truman's declaration of containment in 1947, intelligence gathering received little attention; yet, the inability to provide accurate and perceptive threat assessment plagued decision makers. In other words, because the American public and its leadership failed

¹ Burrows, *Deep Black*, p.25.

to perceive an impending threat, they ignored the need to establish a mechanism to gather information. When US-Soviet tensions mounted, military leaders lacked the intelligence base for proper strategic planning. Consequently, the intelligence shortcomings of the first Joint Chiefs of Staff war plan PINCHER provided the impetus for America's initial postwar aerial reconnaissance.

In the euphoria following victory in World War II, domestic issues dominated American politics. To most Americans, victory signified the end of war and the beginning of normal life. Therefore, returning soldiers to civilian life and the demobilization of the huge wartime military establishment received top priority. Of more than twelve million men under arms at the end of the war, only three million remained by July 1946, and fewer than 1.6 million served a year later.² Likewise, combat capability declined dramatically. The Army dropped from 91 combat-ready divisions to 10 understrength divisions; the Navy retained only 343 combat ships from its 1,166 vessels; and the Army Air Force shrank from 68,400 aircraft in 213 combat groups to 20,800 planes organized in 63 groups (of which only 11 were fully operational).³ Nevertheless, despite the decline in capability, Americans felt secure from outside threat. After all, the United States had just defeated the most powerful military powers in history and alone possessed an awesome new weapon.

Of more immediate concern than external problems, government officials worried about renewed economic depression. The reentry of ten million men

². John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982), p. 23.

³ Steven L. Rearden, *The Formative Years 1947-1950*, History of the Office of the Secretary of Defense, Alfred Goldberg, gen. ed. (Washington, D. C.: Historical Office of the Secretary of Defense, 1984), p. 12 and Steven T. *American War Plans 1945-1950* (New York: Garland Publishing, 1988), p. 12

into the work force and the conversion of factories from military to civilian goods posed significant challenges. Moreover, the release of pent-up demand for consumer goods fueled inflation. In response, the Truman Administration slashed government spending in an effort to maintain balanced budgets. As a result, defense spending dropped from \$42.7 billion and 39.1 percent of Gross National Product in 1945 to \$12.8 billion and 5.7 percent of GNP by 1947.⁴ Thus, military leaders pared units to the bone and cut all non-essential programs.

Despite the surrender of the Axis powers in 1945, peace did not bring tranquility. Although the United States backed the United Nations with enthusiasm, the creation of the new organization failed to establish international harmony. Throughout the globe, nationalism appealed to peoples under European colonial rule. Moreover, Japan, the Soviet Union, and most European nations struggled to rebuild devastated areas and resettle millions of displaced persons. Perhaps most disturbing from an American perspective, the wartime alliance of the United States and the Soviet Union crumbled over German surrender terms termination of Lend-Lease, the future of Eastern Europe and other issues. Although the Cold War had not begun in earnest, fundamental differences hardened attitudes and foreshadowed outright hostility.⁵

By February 1946, George F. Kennan's "Long Telegram" indicated a

⁴ Executive Office of the President, Office of Management and Budget, *Historical Tables Budget of the United States Government, Fiscal Year 1989* (Washington, D. C.: US Government Printing Office, 1988), pp. 39-40 and pp. 46-47.

⁵ For a more comprehensive interpretation of the origins of the Cold War, please consult John Lewis Gaddis *The United States and the Origins of the Cold War* (New York: Columbia University Press, 1972) and *Strategies of Containment* (New York: Oxford University Press, 1982). George F. Kennan *Memoirs 1925-1950* (Boston: Little, Brown & Co., 1967), Adam B. Ulam *The Rivals, America and Russia Since World War II* (New York: Viking Press, 1971) and Walter LaFeber *America, Russia, and the Cold War, 1945-1966* (New York: John Wiley & Sons, 1967).

fundamental shift in the perception of Soviet threat by leading policy makers According to Kennan, the Soviet Union represented a long-term economic and political threat ruled by an opportunistic, brutal regime. Despite wartime cooperation, Soviet Communism remained ideologically opposed to the world's capitalist nations. A traditional and instinctive Russian sense of insecurity formed the basis for a world view that centered upon conflict rather than cooperation. As a result, the Soviet state maintained a large, well-equipped army that demanded Western vigilance. Although the USSR suffered enormous damage from the German invasion and did not seek war in the near future, the Soviet Union represented a fanatical political force sworn to oppose the United States. With dedicated leadership, vast raw materials, and a resourceful population, the Soviet Union represented a dangerous foe. As a result, according to Kennan, the problem of dealing with Soviet hostility "is undoubtedly [the] greatest task our diplomacy has ever faced and probably the greatest it will ever have to face."⁶

Faced with an exodus of personnel, severe funding cuts, and growing international tension, American military leaders grappled with restructuring national defense for the postwar world. Questions of the size, composition, and organization of the armed forces arose as well as bitter arguments over the roles and missions of the services. In addressing the issue of future manpower needs, General George C. Marshall and President Truman backed the concept of Universal Military Training that would provide "universal training" for male citizens and hence reduce mobilization problems. Furthermore, the Army and the Army Air Force supported a proposal to unify the services into a single department of defense with three coequal branches corresponding to the Army,

⁶George F Kennan, *Memoirs 1925-1950* (Boston: Little, Brown and Co., 1967), p. 557. The text of Kennan's "Long Telegram" appears between pp. 547-559.

Navy, and the Air Force. Worried that such a proposal would result in the loss of the naval air arm and the Marines, the Navy countered with the Eberstadt plan that proposed less centralization.¹ For air power proponents, the key issue remained an independent Air Force.²

Worried that a return to peacetime concerns would jeopardize its wartime gains in status, the Army Air Force redoubled efforts to achieve autonomy. Convinced of the dominant role of aviation during World War II, General Henry A. "Hap" Arnold, Commanding General of the USAAF, commissioned studies to assess the impact of new technology upon air power doctrine. In the first series, the United States Strategic Bombing Survey (USSBS) utilized a team of historians, economists, and operations analysts to assess the effectiveness of strategic air warfare during the war. For the most part, the Survey affirmed the precision bombardment doctrine practiced in the Combined Bomber Offensive. In the overall report for Europe, the survey concluded, "Allied air power was decisive in the war in Western Europe."³ Furthermore, the USSBS summary report of the Pacific War stated, "it seems clear that, even without the atomic bomb attacks, air supremacy over Japan could have exerted sufficient pressure to bring about unconditional surrender and obviate the need for invasion."⁴ Nevertheless, the specter of Hiroshima and Nagasaki forced the USAAF to

Under the leadership of Ferdinand Eberstadt the Navy plan emphasized a government-wide coordination of defense policy through a national security council and an independent intelligence agency. The military departments would remain separate entities, but would work together through the JCS, the World War II theater command system, and an array of interservice boards and committees. Rearden, *The Formative Years*, pp. 19-20 & p. 142. Allan R. Millett and Peter Maslowski, *For the Common Defense: A Military History of the United States of America* (New York: Free Press, 1984), pp. 479-480.

¹ Rearden, *The Formative Years*, pp. 11-23.

² United States Strategic Bombing Survey, Over-all Report (European War), September 30, 1945, p. 107 in *The United States Strategic Bombing Survey*, ed. MacIsaac, vol. 1.

³ The United States Strategic Bombing Survey, Summary Report (Pacific War), 1 July 1946, p. 26 in *The United States Strategic Bombing Survey*, ed. MacIsaac, vol. 7.

study the impact of atomic weapons on strategic air war.

In two reports issued in October and November 1945, General Carl A. Spaatz headed a panel to assess the role of the Air Force in the atomic age.¹¹ Joined by Generals Hoyt S. Vandenberg and Lauris Norstad, Spaatz produced relatively cautious documents that paralleled the findings of the USSBS. In the first report, the Spaatz Board concluded that the Air Force now served as the nation's first line of defense since aircraft would be the first units to engage the enemy. Furthermore, because of the destructiveness of atomic weapons, the United States could not afford a surprise attack. Hence, the US must maintain a strategic bomber force in being capable of "smashing an enemy air offensive, or launching a formidable strike force."¹² In the second report, the generals predicted future atomic weapons capable of devastating a ten-mile square area and that other nations would develop atomic bombs and delivery systems.¹³ They recognized the atomic bomb's usefulness in strategic air war, but argued that the weapon did not dictate a change in basic strategic doctrine:

1. The atomic bomb does not at this time warrant a material change in our present conception of the employment, size, organization, and composition of the postwar Air Force.
2. The atomic bomb has not altered our basic concept of the strategic air offensive but has given us an additional weapon.
3. Forces using non-atomic bombs will be required for use against targets which cannot be effectively or economically attacked with the

¹¹ In September 1945, General Spaatz had just returned from the Pacific where he commanded the strategic air campaign in the latter stage of the war. Slated to replace Arnold as the next Commanding General of the Army Air Forces, Spaatz possessed unique qualifications to head this special assignment. During World War II, Spaatz commanded forces involved in joint, combined, strategic, and tactical operations in North Africa, Europe, Italy, and the Pacific. John T Greenwood, "The Atomic Bomb -- Early Air Force Thinking and the Strategic Air Force, August 1945 -- March 1946," *Aerospace Historian* 34 (Fall/September 1987) 159

¹² Quoted in Phillip S Meilinger Hoyt S Vandenberg *The Life of a General* (Bloomington Indiana University Press, 1989), p 63

¹³ Ibid

atomic bomb."⁴

In addition, because of the range limitations of existing bombers, the Spaatz Board urged the creation of a network of overseas air bases.

When viewed from a later perspective, the Spaatz Board missed the revolutionary impact of atomic weapons on strategy. Its conservative assessment merely reinforced existing doctrine by presenting the atomic bomb as a weapon to augment, but not replace, existing bombers. In addition, although the generals advocated the funding of a large scientific research and development program, they failed to anticipate technological breakthroughs, which would result in smaller atomic weapons that could be transported and assembled more easily. However, such criticisms overlook the extreme secrecy surrounding the bomb. For example, even these distinguished AAF generals lacked access to details of bomb yields and existing stockpile numbers. Therefore, the generals assumed the atomic bomb would be a scarce, specialized weapon. In fact, although they lacked access to the specific numbers, Spaatz, Vandenberg, and Norstad proved right about the scarcity of American atomic bombs. Before technological breakthroughs in atomic weapons design in the SANDSTONE tests of 1948, the United States possessed a minuscule number of atomic weapons. The US atomic stockpile only numbered two weapons at the end of 1945, nine by July 1946, thirteen by July 1947, and fifty by July 1948.⁵ Thus, although the Spaatz Board presented an overly cautious assessment of the impact of atomic weapons, actual American capability reinforced the board's findings.

⁴ John T Greenwood "The Atomic Bomb -- Early Air Force Thinking and the Strategic Air Force August 1945 -- March 1946," *Aerospace Historian* 34 (Fall/September 1987) 161

⁵ David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," in *Strategy and Nuclear Deterrence*, ed Steven E Miller (Princeton, NJ: Princeton University Press 1984), p 129. Rearden *The Formative Years*, p 439

In another perceptive assessment, the Spaatz Board's criticism of U.S. intelligence systems reflected American experience with British intelligence during World War II. Despite its occasional lapses, the British intelligence system represented a successful fusion of data collection, collation, analysis, and dissemination of intelligence information. Unfortunately, except for a few Americans involved in ULTRA and Y-service communications intelligence, the British controlled the Allied intelligence organization.¹⁶ Because of their close association with the British, Spaatz, Vandenberg, and Norstad appreciated their counterparts' attributes. Nevertheless, they believed "that although the United Kingdom remained a close ally, the United States could not afford to be dependent on British intelligence. As a result, the Spaatz Board recommended an intelligence organization capable of knowing the strategic vulnerability, capabilities, and intentions of any potential enemy."¹⁷ Moreover, General Vandenberg served on a separate subcommittee to evaluate the Army's G-2 (Intelligence) Division. Headed by Assistant Secretary of War for Air Robert A. Lovett, the committee's report chided the Army for a lack of cooperation between users and producers of intelligence information and for the poor quality of Army intelligence personnel.¹⁸ Therefore, in its various assessment efforts, the Army Air Forces recognized problems with its intelligence organization. Unfortunately, intelligence weaknesses remained only one of the major shortcomings facing the Air Force on the verge of its independence.

In an effort to prepare the AAF for its postwar defense roles and to enhance its transition to autonomy, General Arnold reorganized the air arm on

¹⁶ "Y-service" referred to the intercept of low-grade communications intelligence such as radio messages between tactical units. Meilinger, *Vandenberg*, p. 68.

¹⁷ Greenwood, "The Atomic Bomb -- Early Air Force Thinking and the Strategic Air Force, August 1945 - March 1946," p. 161.

¹⁸ Meilinger, *Vandenberg*, p. 56.

functional lines. Effective on March 21, 1946, the War Department authorized three combat commands for the AAF: Air Defense Command (ADC), Strategic Air Command (SAC), and Tactical Air Command (TAC).¹⁹ Although theoretically coequal, the Strategic Air Command received priority because of the air leaders' conviction that strategic bombardment represented the future of war. Accordingly, SAC's initial mission statement of March 12, 1946 carried the doctrinal torch passed by Douhet, Mitchell, and the Air Corps Tactical School:

The Strategic Air Command will be prepared to conduct long range offensive operations in any part of the world either independently or in cooperation with Naval forces; to provide combat units capable of intense and sustained combat operations employing the latest and most advanced weapons; to train units and personnel for the maintenance of the Strategic Forces in all parts of the world; to perform such special missions as the Commanding General, Army Air Forces may direct.²⁰

Initially under the command of General George C. Kenney, the Strategic Air Command served as the focus of the AAF's attempt to organize a strategic strike force. SAC received responsibility for most of the AAF's heavy bombers. In addition, AAF regulations charged SAC with the responsibility of preparing plans for strategic aerial reconnaissance on a global scale and training "very long range" reconnaissance, photographic, and mapping crews. In October 1946, SAC modified its mission statement to acknowledge the reconnaissance mission:

The Strategic Air Command will provide and operate that portion of the AAF which is maintained in the United States, and in such other areas as may be designated from time to time for employment against objectives of air attack in any location on the globe and will conduct long-range reconnaissance over land or sea, either independently or in cooperation

¹⁹ Borowski, *A Hollow Threat*, p. 32.

²⁰ Headquarters Strategic Air Command, *Strategic Air Command Statistical Summary*, Vol. 1, No. 1 June 1946, p. 1, File number 416.01, 21 Mar 1946-31 Dec 1946, v. 4, United States Air Force Historical Research Center, Maxwell Air Force Base, Alabama (hereafter abbreviated USAFHRC).

²¹ with other components of the armed forces.

Despite its prominence in AAF doctrine and organization SAC suffered from demobilization and budget cuts which drained it of genuine capability. In overall terms, the Army Air Forces released 734,715 officers and men by February 1946. Likewise, the flood of personnel reduced the overall number and experience of those assigned to SAC. In May 1946 the AAF authorized SAC 43,729 men, but the command actually possessed only 37,426.

Throughout the year, numbers declined so that by December 1946, America's strategic strike force only numbered 32,190 personnel.²² To make matters worse, nearly twenty-five percent of this meager force consisted of first-term airmen with six months or less experience.²³ Moreover, aircraft strength proved inadequate. In March 1946, SAC possessed 126 very heavy and heavy bombers and 191 reconnaissance and liaison aircraft.²⁴ By the end of the year, the Strategic Air Command's bomber force grew to 248 heavy bombers, but numbered only fifty-three reconnaissance planes, including only two F-3 long-range photographic reconnaissance aircraft.²⁵ In addition, poor training and

² Headquarters, Army Air Forces, AAF Regulation No. 20-20, 10 October 1946 quoted in Headquarters Strategic Air Command, *Strategic Air Command Statistical Summary*, Vol 1 No. 4, 1 Nov 1946, File Number 416.01.21 Mar 1946-31 Dec 1946, v. 4, USAFHRC.

²² Headquarters Strategic Air Command, *Strategic Air Command Statistical Summary*, Vol. 1, No. 6, 1 Jan 1947, File Number 416.01, 21 Mar 1946-31 Dec 1946, v. 4, USAFHRC; Borowski, A Hollow Threat, p. 30.

²³ Borowski, *A Hollow Threat*, p. 45.

²⁴ In March 1946, the AAF considered B-29s "very heavy bombers" (VHB) and B-17s and B-24s "heavy bombers." With the introduction of new aircraft in 1947 and 1948, the categories changed. The massive B-36 was considered a VHB, B-50s and B-29s became heavy bombers, and the few remaining B-24s and B-17s were classified medium bombers. Hq SAC, SAC Statistical Summary, c 2, 1 Jan 47, USAFHRC.

²⁵ The F-13 consisted of a B-29 airframe modified during assembly to accommodate cameras. In 1948, the Air Force redesignated the aircraft as an RB-29. Also, the decline in reconnaissance capability is shown by the following table:

SAC Reconnaissance and Liaison Aircraft

March April May June July August September October November December
 191 116 96 86 67 65 65 62 58 53

inadequate leadership exacerbated personnel shortages and equipment. With the end of the war, the average soldier or airman lost interest in training. Attempts to reinstitute training programs failed as experienced personnel left the service.²⁶ Although General Kenney headed SAC on paper, in reality, he spent most of his time on duties associated with his position as special advisor on military affairs to the US delegation at the UN. Instead, his deputy, Major General St. Clair Streett ran SAC operations.²⁷ Lacking guidance from General Kenney, General Streett and his replacement, Majc General Clement McMullen, drifted from SAC's primary purpose. They viewed basic flying proficiency, mobilization, and deployment as SAC's principal mission, not combat readiness. In other words, SAC stressed activities necessary for generating a combat force, rather than training to conduct combat operations.²⁸ Thus, in 1946 SAC lacked the capability to wage strategic air war.

Ironically, even as the Strategic Air Command struggled, the Joint Chiefs of Staff (JCS) produced war plans based upon the strategic bombing doctrine seemingly vindicated by World War II. Although the JCS had produced previous assessments of Soviet intentions and capabilities, the series of war plans known as PINCHER established the basic outline for America's military

²⁶ Historian, Strategic Air Command, *Strategic Air Command - 1946: Organization, Mission, Training and Personnel*, Vol 1 Text, (n. p : April 1948), p. 66, File Number 416.01, v 1, 21 Mar 31 Dec 1946, USAFHRC.

²⁷ Borowski, *A Hollow Threat*, p. 39

²⁸ In essence, during this period SAC trained and operated under peacetime conditions and lacked the capability to fly arduous combat sorties. The official SAC history attributes the shortcoming to "the floodgates of demobilization," but Harry R. Borowski blames misguided leadership Historian, SAC, *Strategic Air Command - 1946*, p. 66 and Borowski, *A Hollow Threat*, pp. 36-48

response to the Soviet Union in the event of an all-out conflict.²⁹ In other words, PINCHER addressed the questions of how and when a war would begin, the initial course of operations, and the strategic framework for US operations. Like World War II's Rainbow plans, PINCHER formed the basis for conceptual thinking about the next war. Furthermore, PINCHER showed the JCS's perception of the Soviet threat and its acceptance of AAF strategic bombing doctrine.³⁰ Finally, an analysis of PINCHER revealed glaring limits in American intelligence capability.

Although the JCS realized growing tensions between the United States and the Soviet Union, American strategists considered the outbreak of war unlikely. In JPS 789 "Concept of Operations for 'PINCHER,'" the Joint Staff Planners estimated that Soviet economic potential remained undeveloped and "at least for the next ten or fifteen years, the gains to be derived internally during peace outweigh the advantages of any external objective that might be attained at the risk of war."³¹ However, planners believed that the Soviets would apply maximum political pressure to attain Soviet domination of bordering countries.

²⁹ For a description of JCS thinking about the Soviet Union in the latter stages of World War II, see Steven T Ross, *American War Plans 1945-1950* (New York: Garland Publishing, 1988), pp. 4-6. In addition, the PINCHER plans consisted of a number of documents, including

JPS 789 Concept of Operations for "PINCHER," 2 March 1946

JPS 789/1, Staff Studies of Certain Military Problems Deriving from "Concept of Operations for 'PINCHER,'" 13 April 1946

JWPC 432/3, Joint Basic Outline War Plan. Short Title "PINCHER," 27 April 1946

JWPC 432/7, Tentative Over All Strategic Concept and Estimate of Initial Operations. Short Title "PINCHER" 18 June 1946

JWPC 458/1 Preparation of Joint Plan "Broadview," 5 August 1946
These plans vary in details, but remain consistent in overall concept. For a reproduction of these documents in facsimile form see Steven T Ross and David Alan Rosenberg, ed. *America's Plans for War Against the Soviet Union, 1945-1950, Vol. 2. The Pincher Plans* (New York: Garland Publishing, 1989)

³⁰ See Ross, *American War Plans*, chapter 2 "The Pincher Plans," pp. 25-49 for an overview

³¹ JPS 789, Joint Staff Planners, "Concept of Operations for 'PINCHER,'" 2 March 1946, Enclosure "B," p. 4, in Steven T Ross and David Alan Rosenberg, ed., *America's Plans for War Against the Soviet Union, 1945-1950, Vol. 2: Design for Global War: The Pincher Plans* (New York: Garland Publishing, 1989)

Therefore, they created a scenario in which World War III started as a result of a Soviet miscalculation that led to a Soviet invasion of Turkey. Because the loss of Turkey threatened the Suez Canal, Great Britain intervened in defense of the Empire's life-line.³² For planning purposes, the staff officers assumed M-day (Mobilization day) as July 1, 1947 and US entry into the war on January 1, 1948. Conveniently, the Joint Staff Planners assigned Britain its time-honored role of battling the enemy until the United States mobilized. PINCHER even debated whether the US would declare war without an overt act similar to Pearl Harbor.³³

In contrast to War Department thinking during World War II, PINCHER adopted wholeheartedly the assumptions of strategic bombing doctrine. Because US, British, and French occupation forces could not resist the Soviet invasion of Europe that followed its thrust into Turkey, the Joint Staff relied on strategic air power to stem the tide.³⁴ Moreover, because Allied military capabilities paled in comparison to World War II (with a low ebb predicted for mid-1946), the United States lacked the strength to pursue other strategies.³⁵ Planners concluded that "the cost of liquidating her [the Soviet Union's] massive ground forces in a war of attrition by the direct application of our ground armies would be prohibitive. It thus becomes necessary to select operations which are more in consonance with our military capabilities and in which we can exploit

³² The Joint Staff Planners' reasoning shows more wishful thinking than analysis. In 1947 would Britain really declare war on the Soviet Union over Turkey and a threat to the Suez Canal? Did the British have the resources or the will to fight following the destruction of World War II? Perhaps the initial scenario paid homage to America's traditional reluctance to enter "foreign wars." Regardless, the plans reflect the lack of political guidance received by the military from the Truman Administration. JPS 789, Enclosure "B," p. 6 in Ross and Rosenberg, *America's Plans for War*, vol. 2.

³³ Ibid., p. 6; JWPC 432/3, Enclosure "B," p. 3 in Ross and Rosenberg, *America's Plans for War*, vol. 2. (All other citations of PINCHER documents cited hereafter are found in the Ross and Rosenberg facsimile collection, *America's Plans for War*, vol. 2.)

³⁴ JPS 789, Enclosure "B," p. 8.

³⁵ JPS 789, Enclosure "B," p. 14.

our superiority in modern scientific warfare methods."³⁶ Thus, the PINCHER war plans stressed the destruction of the Soviet "will to resist" by crushing her war-making capacity through air bombardment. Echoing the air prophets of the preceding generation, the Joint Staff Planners stated confidently:

There are a number of factors which could lead to the capitulation of the U.S.S.R. prior to the defeat of her armed forces, such as: the collapse of her totalitarian government; destruction of her industry or the complete disruption of her communication system.³⁷

Accordingly, PINCHER proposed destroying "definite areas which contain a substantial portion of vital resources, without which the Soviet war effort would be seriously curtailed (if not prevented)." These "vital areas" (reminiscent of Mitchell's vital centers) included in order of precedence:

1. Moscow area
2. Caucasus area
3. Ploesti area
4. Ural area
5. Stalingrad area
6. Kharkov area
7. Lake Baikal area
8. Leningrad area³⁸

Therefore, because of demobilization and severe budget limits, the Joint Chiefs of Staff relied on the theory of strategic aerial bombardment as the primary American response to war with the Soviet Union.

At the heart of JCS planning, the Joint Intelligence Committee (JIC) presented a Soviet military machine of awesome potential. Like the United States, the Soviet armed forces had reduced their strength from World War II levels. According to JWPC 432/3, one of the later PINCHER estimates, Soviet armed forces consisted of 6,400,000 men (347 divisions) in March 1946. By

³⁶ JPS 789, Enclosure "B," pp. 15-16

³⁷ Ibid., p. 3

³⁸ JPS 789, Enclosure "B," p. 16

September, 1946, Soviet land strength would drop to 4,800,000 and further cuts would reduce it to 3,110,000 (113 divisions) by the projected date of PINCHER in 1947.³⁹ Nevertheless, the still massive Soviet Army possessed up-to-date armor and capable tactical air forces. Although not rated as highly as the German *Luftwaffe*, the Soviet Air Force deserved respect for its overall size, roughly 20,000 aircraft in tactical units and 50,000 overall, and proficiency in ground attack.⁴⁰ On the other hand, the Joint Staff considered Soviet naval forces, amphibious lift, and strategic air forces "ineffective."⁴¹ In addition, JCS planners believed the Soviets incapable of fielding atomic weapons by the

³⁹ The estimated break down of Soviet Army forces follows

70 Rifle divisions	840 000
5 Mountain divisions	60 000
5 Airborne divisions	50 000
20 Tank and Mechanized corps	240.000
5 Cavalry corps	75 000
8 Artillery divisions	200.000
113	1 561.000
Overhead services schools, training	1.250.000
<u>NKVD (border guards and troops)</u>	<u>500.000</u>
Total	3,311.000

JPS 789, Annex "A" to Enclosure "B," p 23, JWPC 432/3, Appendix to Enclosure "B" p 17

⁴⁰PINCHER listed Soviet Air Force strength as follows

Source	Fighters	Bombers	Ground Attack	Total
Obsolescent	400	1 000		
New Soviet Types	15 000	7,000		
Lend-Lease	1,600	1,500		
Total Combat Aircraft	17,000	9,500	9,000	35,500*
Trainers				12 000
Transports				2,500
Total Aircraft				50.000

⁴¹Of this total only 20,000 were in tactical units, 15,500 being in training units and stored reserves. The total included 3,800 naval aircraft JPS 789, Annex "A" to Enclosure "B" p 25

" JWPC 432/3, Appendix to Enclosure "B" p 17

outbreak of the war.⁴² As a result, Soviet offensive military capabilities rested upon land operations. In overall terms, the JCS considered the Soviets capable of a *blitzkrieg* more impressive than the German drive in 1940.

PINCER envisioned Soviet offensives:

- a. To consolidate her positions in western Europe, Italy, Greece, Turkey, Persian Gulf area, Manchuria and Korea.
- b. To overrun and occupy Spain.
- c. To overrun and occupy the Scandinavian countries . . .
- d. To advance into Afghanistan.
- e. To conduct air operations against the British Isles, Spain, North Africa, Middle East, North China, Japan, the Aleutians and Alaska.
- f. To conduct limited raids against Iceland, Greenland, the Azores, and the Philippines.
- g. To conduct naval operations in the Black, Baltic and Okhotsk Seas, limited raids in the Atlantic and Pacific, and submarine operations in both these latter areas.⁴³

In sum, PINCHER's estimate of Soviet capabilities matched a land juggernaut against a strategic air force armed with a limited number of atomic weapons.

Since the JCS plan only covered the initial stages of the war, PINCHER made no definitive predictions of the war's outcome or plans for the reconquest of Europe.

Besides its importance for presenting the JCS perception of the Soviet threat and acceptance of strategic air war doctrine, the PINCHER plans revealed significant gaps in US intelligence capabilities. Although designed as a conceptual outline for a later Basic War Plan, PINCHER acknowledged the JCS's inability to plan a strategic air campaign due to a lack of intelligence data:

⁴² In JPS 789 planners estimated that the Soviets could complete the abstract research for atomic energy within two years. Three additional years would be required to design and construct the mining, power, transportation, and manufacturing facilities needed for weapons production. By JWPC 432/7, the Joint Staff considered it unlikely that the Soviets would be able to develop an atomic device before 1948 and it might take until 1956. In turn, the planners predicted that the Soviets would not be able to produce atomic energy by June 1949, although they might be capable of producing weapons based upon radioactive dust or gas. JPS 789, Annex "A" to Enclosure "B," p. 28; JWPC 432/7, Annex "A" to Appendix "A" to Enclosure "B," p. 29.

⁴³ JWPC 432/3, Appendix to Enclosure "B," p. 18.

The scarcity of reliable and detailed intelligence on the U.S.S.R. precludes the determination at this time of specific target systems for air attack. Any strategic bombing program established at this time would be provisional even for purposes of current planning; it is certain to be altered radically when additional information becomes available. The current lack of intelligence on the U.S.S.R. is due not only to the rigid security maintained by that country, but also to the fact that such information as is available has not yet been properly assembled. It will be possible to improve this appreciation by incorporating in it new intelligence as the information now available to the various intelligence agencies is correlated.⁴⁴

To conduct an air war, strategic planners needed information concerning all aspects of the Soviet economy and war potential. For a start, a precision air campaign along the lines of the USAAF bombing of Germany required information on the Soviet transportation network, electric power grid, key plant locations, and raw material supply.⁴⁵ Planners needed this information to prioritize missions and determine specific targets. In order to hit their targets, bombers must find them. Air crews required the detailed maps, charts, weather information, and supplemental data that comprised the target folders of World War II. To circumvent this lack of information, PINCHER resorted to naming urban areas as targets. Thus, thirty cities became the "vital centers" of the projected strategic air campaign.⁴⁶

War Plan PINCHER's intelligence shortcomings focused attention on target selection in strategic air warfare. According to the United States Strategic Bombing Survey (USSBS), "The importance of careful selection of targets of air

⁴⁴ The PINCHER documents do not specify the information to be collated. In all probability, it refers to captured German intelligence archives, including aerial photographs, and interviews with former prisoners of war. JPS 789/1, Appendix "B," p. 19.

⁴⁵ Ibid.

⁴⁶ Annex "A" to Appendix "B" lists the urban industrial concentrations: Moscow, Gorki (Gorky), Kuibyshev (Samara), Sverdlovsk, Novosibirsk (Novo Sibirsk), Omsk, Saratov, Kazan, Leningrad, Baku, Tashkent, Chelyabinsk, Nizhni Tagil, Magnitogorsk, Molotov, Tbilisi (Tiflis), Stalinsk, Grozny, Irkutsk, Yaroslavl, Dnepropetrovsk, Stalino (Stalin), Khabarovsk, Vladivostok, Ufa, Chkalov (Orenburg), Kirov, Kemerovo, Komsomolsk, and Zlatoust. JPS 789/1, Appendix "B," pp. 20 and 31-33.

attack is emphasized by the German experience. . . In the field of strategic intelligence there was an important need for further and more accurate information, especially before and during the early phases of the war.⁴⁷ Furthermore, the USSBS criticized the inadequate strategic intelligence in the Pacific which made prewar war plans "unreliable." The survey concluded that a comparable situation in a future war might prove disastrous. The only remedy appeared in a peacetime program to gather adequate information.⁴⁸ Unfortunately, the Soviet Union posed an unprecedented intelligence challenge. Imperial Russia, as well as its Communist successor, possessed a historical tradition influenced by xenophobia, secrecy, and limited contact with the outside world. Moreover, the Soviet Union presented vast distances, uncharted resources, and a formidable secret police network. In many ways, the United States knew less about the Soviet Union than prewar Japan.

In order to conduct a precision bombing campaign, the United States needed a vast amount of accurate information. Dr. James Lowe, an analyst for Air Intelligence, offered the "four foundation stones" of target analysis:

1. An exact knowledge of the 70,000 or more potential bombing objectives . . .
2. An exact knowledge of the mission of the attacking air force . . .
3. Reasonable approximation of the capabilities of the attacking air force .
4. Some professional "know how" with respect to analyzing these 70,000 or more targets, sifting them down to a very fine mesh until we finally arrive at the minimum number of targets within the capabilities of the attacking air forces, the destruction of which would make the maximum contribution to an accomplishment of the mission of the attacking air

⁴⁷ United States Strategic Bombing Survey, Over-all Report (European War), September 30, 1945, p. 108, in *The United States Strategic Bombing Survey*, ed. MacIsaac, vol. 1. See also Dr. James Lowe, "Intelligence Basis for Selecting Strategic Target Systems," Address to Air War College, 13 Dec 1946, pp. 1-2. File number K239 715246-22 13 Dec 1946, USAFHRC

⁴⁸ USSBS, Summary Report (Pacific War), 1 July 1946, in *The United States Strategic Bombing Survey*, ed. MacIsaac, vol. 7. Lowe, "Intelligence Basis," pp. 1-2

forces.⁴⁹

In addition, planners sought to look at the enemy's entire industry and identify the segment that supported his offensive capability. Ideally, initial air strikes could disarm the enemy and prevent retaliatory strikes upon the United States.⁵⁰ Dr. Lowe agreed with the USSBS: target intelligence files required information gathered in peacetime. No time interval existed in modern warfare to gather information, select targets, and collect operational data needed for weapons delivery.⁵¹ In sum, both PINCHER's flaws and Air Intelligence requirements pointed to the need for peacetime aerial reconnaissance.

Given the limitations of United States intelligence capability, what types of information could the United States collect in the immediate postwar period? Before the establishment of the Central Intelligence Agency in 1947, no centralized agency existed for the coordination of American intelligence efforts; however, various projects sought to plug intelligence gaps. Perhaps the most noteworthy involved the interrogation of former Soviet internees and prisoners of war. Eventually called Project WRINGER by the Air Force, the program started in December 1946 by the joint service Far East Command. WRINGER employed 1,800 specially trained military and civilian personnel in Germany, Austria, and Japan to question thousands of prisoners repatriated by the Soviet Union. By 1951, WRINGER provided the bulk of strategic intelligence for the Air Force.⁵² In addition, various Allied intelligence agencies sifted through German

⁴⁹ Dr. James Lowe worked for the Strategic Vulnerability Branch of Air Intelligence Division of the Air Staff. Lowe, "Intelligence Basis for Selecting Strategic Target Systems," p. 15.

⁵⁰ This concept evolved into the "blunting" strikes called for by later war plans. *Ibid.*, p. 6.

⁵¹ *Ibid.*, p. 3.

⁵² "Japanese-American Friction over Wringer Program," in FEAF Historical Report, Nov. 1953 Development of FEAF's Intelligence Collection Plan, p. 44, File number K-720 02, Box 4, Nov. 1953. USAFHRC.

intelligence archives from World War II.⁵³

During the turmoil of demobilization, aerial reconnaissance efforts centered on long-range photomapping and *ad hoc* Ferret missions. The Strategic Air Command's 311th Reconnaissance Wing controlled Army Air Forces reconnaissance assets from its headquarters at MacDill Field, Florida. With less than five percent of the earth's surface mapped in detail, including only half of the continental United States, the 311th Reconnaissance Wing concentrated on long-range photomapping as its primary mission.⁵⁴ Of those areas already mapped, a major problem existed: each country in the past established a point within its boundaries as a reference position and determined latitude and longitude in relation to that point. Until the age of air travel, the lack of map cohesion made little difference, but long-range bombers required pinpoint accuracy. The navigational problems posed for an aircraft flying from one geographic reference area to another dictated a need for expanded and improved aerial mapping.⁵⁵ Therefore, the 311th Reconnaissance Wing mapped areas of occupied Europe, occupied Asia, selected Pacific areas, South America, and the continental United States according to a priority established by the Joint Mapping Board.⁵⁶ Although the wing's mission statement included providing intelligence for SAC's long-range

⁵³ David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy 1945-1960" in *Strategy and Nuclear Deterrence*, ed. Steven E. Miller (Princeton, N.J.: Princeton University Press, 1984), p. 125.

⁵⁴ Harold A. Schwandt, "Camera Equipment for Reconnaissance over Unmapped Areas," Air Command and Staff School Research Paper, May 1949, p. 2. File number 239 04349A-385. USAFHRG.

⁵⁵ "History of the 55th Strategic Reconnaissance Wing (M)," Forbes Air Force Base, Topeka, Kansas, March 1953, p. iii. File number KG-WG-55-HI Feb 53. USAFHRG.

⁵⁶ Letter, Commanding General, Strategic Air Command to Commanding General, Army Air Forces Subject Operational and Administrative Control of the 311th Reconnaissance Wing and its Assigned Units, 15 August 1946. File number 416 01, v2 21 Mar 1946 - 31 Dec 1946. USAFHRG.

mission, most postwar flying fulfilled mapping requirements.¹⁷

A series of agreements between the United States and Britain established the initial tasking for postwar photographic reconnaissance and mapping. On May 10, 1945, Headquarters, Army Air Forces directed the United States Air Forces in Europe (USAFE) to map occupied Europe.¹⁸ Within a month, the United States Strategic Air Forces and the Royal Air Force reached an agreement to cooperate in the task. Both parties split central Europe at 50° 20' North latitude, with the British covering the northern portion and the US mapping the southern section. According to the agreement, each plane would operate two cameras simultaneously and deliver one negative to each party.¹⁹ By November 1945, the US Joint Chiefs of Staff accepted a British proposal to extend the photographic exchange world-wide.²⁰ Thus, the British-American agreements established procedures for high-priority photo reconnaissance and continued the intelligence sharing of the war years.

Like other Army Air Force units, the 311th Reconnaissance Wing struggled to accomplish its mission in the period of postwar ferment. Personnel shortages and inexperienced crew members plagued the wing, forcing it to rely on technical schools and On-the-Job Training (OJT) to relieve critical

Ibid

¹⁷ Letter I H Edwards, Major General U S Army, Headquarters, United States Air Forces in Europe, Office of the Commanding General to the Commanding General, Army Air Forces 25 April 1946 Subject British Cooperation on Post Hostilities Mapping Program Europe TS Control Number ABI-294, File ABI-201-400, Box 37, Entry 214, Record Group 341, Modern Military Branch National Archives Washington, D C (Hereafter abbreviated RG 341, NA)

¹⁸ Ibid

¹⁹ The series of documents outlining the program did not mention aerial photography of the Soviet Union. Because of the potential political ramifications even at this early date I believe this omission indicates that photomapping of the Soviet Union did not occur. Memorandum for the Record (MFR), E P Mussett, Colonel, Air Corps, Chief Plans & Policy Branch Executive Division AC/AS-2 Subject Daily Activity Report n d ABI-150 File ABI 1-200 Box 37 Entry 214 RG 341 NA

deficiencies.⁶¹ The AAF also detached photographic squadrons from the 311th Wing control and placed them under overseas theater commanders. This practice scattered experienced crews and created rifts between operational units and the parent training and support organizations. As a result, photographic effectiveness and organizational efficiency declined.⁶² Attempts to restore organizational control and to accomplish assigned missions with existing resources diverted SAC reconnaissance from important long-range problems.

The introduction of jet aircraft threatened World War II-vintage photo reconnaissance aircraft with obsolescence. During the war, modified Spitfires and P-38 Lightnings relied on speed and altitude for protection. When the Germans introduced jet fighters, this margin of safety vanished, but overwhelming Allied numbers assured continued air superiority. Unfortunately, US photographic reconnaissance in the immediate postwar period faced a dilemma. Existing jet aircraft lacked the range and reliability for penetration missions into the Soviet Union and photo reconnaissance aircraft based on bomber airframes lacked the speed and altitude for safety. Until technological advances solved the dilemma (in the form of the U-2), the Soviet Union remained impervious to American photographic reconnaissance whether for target information, mapping, scientific/technical intelligence, or attack warning.

⁶¹ Historian, Strategic Air Command, *Strategic Air Command -- 1946: Organization, Mission, Training and Personnel*, vol. 1: Text (n. p.: April 1948), pp. 153-154, File number: 416.01, v. 1, 21 Mar 1946- 31 Dec 1946, USAFHRC.

⁶² In June 1946, the 311th Wing consisted of the 1st, 3rd, 12th, 16th, and 91st Reconnaissance Squadrons and the 7th Geodetic Control Squadrons. By September 1946, the AAF detached the 1st, 3rd, 12th, and 91st squadrons. Letter, CG SAC to CG AAF, Subj: Operational and Administrative Control of the 311th Wing, 15 Aug 46, File number: 416.01, v. 2, 21 Mar- 31 Dec 1946, USAFHRC; *SAC Statistical Summary*, Vol. 1, no. 1, p. 2 and Vol. 1, no. 2, p. 2, File number: 416.01, v. 4, 21 Mar-31 Dec 1946, USAFHRC.

On the other hand, electronic intelligence represented an area open to US aerial reconnaissance in the early years of the Cold War. With American war plans relying on strategic bombardment, electronic reconnaissance missions offered a means to assess enemy defenses. By flying along the periphery of the Soviet Union, Ferret aircraft identified radar sites and analyzed their signals. Even though the combination of radar and jet fighters threatened the founding assumptions of strategic bombardment doctrine, initially, the Army Air Forces showed little interest in ELINT or Ferret flights.

The *ad hoc* origins and shoe-string budgets of postwar ELINT reflected a general apathy for electronic warfare. According to Dr. George W. Rappaport, a pioneer of US military electronics, electronic countermeasures faced opposition on three fronts: the radio industry, radar scientists, and the military "top brass." With the end of World War II, major companies in the radio industry ceased to be concerned with defense contracts. Instead, Zenith, RCA, and Motorola wished to build radios and televisions for the domestic market. Moreover, scientists involved in developing advanced microwave radar argued that their innovations made radar immune to jamming. Finally, Rappaport summed up the attitude of high-ranking officers with the phrase: "Forget about countermeasures -- it was a wartime weapon and there's no need for it in peacetime."⁶³ Consequently, postwar demobilization and budget cuts eliminated the US electronic reconnaissance program developed during World War II.

The postwar resurrection of electronic reconnaissance emanated from two separate sources. With growing tensions in US-Soviet relations, the Strategic Air Command explored the possibility of attacking Soviet targets via

⁶³ Interview, Dr. George Rappaport by Alfred Price and Armand J. Morin, Fall 1981, File 14, AOC Archive, Alexandria, Va.

great circle routes flown over the North Pole. The Nanook Project directed 311th Reconnaissance Wing aircraft to map the northern section of Greenland, while a separate Ferret aircraft searched for Soviet radar sites in this uninhabited area.⁶⁴ A second project began when Yugoslavia downed an American C-47 transport in August, 1946. The incident sparked USAFE's interest in a Ferret program to determine whether the Yugoslavian anti-aircraft guns were radar guided.⁶⁵ Although the projects reflected relatively uncoordinated, improvised efforts, they formed the basis for postwar aerial reconnaissance.

The first SAC postwar ELINT operation reflected concern for Soviet radar employment along potential Arctic approach routes for bombers. Captain Les Manbeck served as the SAC action officer for electronic reconnaissance. In planning the Greenland operation, Manbeck started from scratch. On August 27, 1946, he recruited First Lieutenants John E. Filios and Henry C. Monjar to serve as Ravens for a B-17G Ferret.⁶⁶ In addition, Manbeck arranged for Mr. Jim Scott of Wright Field, Ohio to "jury-rig" the plane with the necessary equipment to detect Soviet radar.⁶⁷ After installation, the B-17G Ferret deployed to Bluie West 8 (later Sondrestrom Air Base), Greenland. From September 2-20, 1946, the crew search for signals over Greenland and adjacent Arctic regions with no success. Although the first SAC Ferret failed to

⁶⁴ Historian, SAC, SAC -- 1946: *Organization, Mission, Training and Personnel*, Vol. 1: Text, p. 154; Winter, AOC 47, p. 15.

⁶⁵ Interview, Ingwald Haugen, Lt. Col., USAF, (ret.) by Alfred Price, n. d., pp. 4-5, File 25; Col. I. Haugen, AOC Archive, Alexandria, Va.

⁶⁶ Both Filios and Monjar were trained as RCM Radar Observers, MOS 7388, during World War II. Letter, H. C. Monjar to Frank Voltaggio, 10 June 1982, p. 4, File 59; Lt Col H. Monjar, AOC Archive, Alexandria, Va.

⁶⁷ This equipment included AN/APR-4 and AN/APR-5 search receivers, AN/APA-10 and AN/APA-11 pulse analyzers, a Hewlett-Packard Audio Oscillator, an associated PRF analyzer, and an ink-on-tape recorder. Frank Voltaggio, "Out in the Cold . . . : Early ELINT Activities of the Strategic Air Command," p. 6, File: Voltaggio, AOC Archive, Alexandria, Va.

detect any Soviet radars, it served as the foundation of further ELINT efforts.⁶⁸

In an unrelated episode, the United States Air Forces in Europe inaugurated an electronics reconnaissance program in response to the Yugoslavian downing of an American C-47 transport.⁶⁹ USAFE staff officers suspected that the Yugoslavs used radar-directed anti-aircraft guns for the shoot down. As a result, Headquarters USAFE outfitted two B-17s with two AN/APR-4 search receivers and AN/APA-17 and AN/APA-24 direction finding antennas to investigate the incident. A former RCM Observer, First Lieutenant Ingwald Haugen operated the equipment.⁷⁰ Using British GEE radar navigation equipment to prevent infringement of Yugoslav airspace, the B-17 Ferrets discovered the distinctive 570 MHz signals of a German *Wurzburg* radar. The direction-finding (D/F) bearings crossed at the site of a former German radar school. Evidently, Yugoslav air defense forces restored one of the German *Wurzburg* fire control systems.⁷¹

Having solved the Yugoslav mystery, USAFE utilized the B-17 Ferrets as the nucleus of an on-going ELINT program. Designated the 7499th Squadron, the Ferrets flew roughly three missions a week along the borders of Soviet-occupied Germany and Austria and over the Baltic Sea. The initial electronic reconnaissance sorties proved useful in assessing Soviet radar capabilities along the East-West frontier. They determined that the Soviets employed a small number of 70 MHz early warning radars of Russian manufacture, nicknamed "Dumbo," with a range limited to one hundred miles. Only operating

⁶⁸ Voltaggio, "Out in the Cold . . . : Early ELINT Activities of the Strategic Air Command," rev. ed., pp. 4-5.

⁶⁹ Against the background of a Yugoslav-Italian dispute over Trieste, Anglo-American occupation forces faced Yugoslav troops. On August 19, 1946, Yugoslavian forces shot down another C-47 which created an international incident. Dean Acheson, *Present at the Creation: My Years at the State Department* (New York: W. W. Norton & Co., 1969), pp. 194-196.

⁷⁰ Haugen, ACC 25, pp. 4-5.

⁷¹ Ibid., p. 5.

between six and twelve sets at a time, the Soviets periodically shifted locations to mask their limited capability. With the exception of the Yugoslav Wurzburg, the Ferrets detected no anti-aircraft fire-control radar.⁷² Unfortunately, the USAFE Ferrets could not confirm the reasons for this lack of coverage; perhaps, the Soviets established more extensive coverage near vital areas of the Soviet Union. Nevertheless, the USAFE Ferret program provided the first hard evidence of Soviet defense capability against air attack.

The creation of a postwar aerial reconnaissance program illustrated the dichotomy between American intelligence collection capabilities and its need for information. With the initial Ferret program, the United States collected data on Soviet radar systems useful for planning bomber penetration and designing jamming equipment; however, the Army Air Forces required basic economic information to determine target priorities. Furthermore, the Strategic Air Command needed photographic reconnaissance for chart preparation and target folders. On a larger scale, the United States lacked the information necessary for proper threat assessment. As PINCHER showed, the Joint Chiefs of Staff grappled with producing a war plan without knowing the actual threat. Moreover, without empirical evidence, American political leaders struggled to understand Soviet capabilities and intentions in a period of rapid change. Nevertheless, blinded by domestic concerns, demobilization, and reduced budgets, the Truman Administration remained confident in America's atomic arsenal. Air chiefs also focused on the atomic potential, with hopes that the unique capability would lead to service independence. Without understanding the capabilities and limits of US power, in 1945-1946, the United States failed to assess the threat.

⁷² Ibid., pp. 5-6.

CHAPTER III

FROM CONTAINMENT TO BERLIN: ORGANIZATIONAL STEPS TO FILL INTELLIGENCE GAPS, 1947-1948

It is sufficient to estimate the enemy situation correctly and to concentrate your strength to capture him. There is no more to it than this. He who lacks foresight and underestimates his enemy will surely be captured by him.

Sun Tzu¹

During the time between the President's announcement of the Truman Doctrine in March 1947 and the Berlin Crisis of summer 1948, international events contributed to a growing awareness of the Soviet threat and American military weakness. From an American perspective, increased Soviet intransigence with regard to Eastern Europe, Soviet encroachment in Turkey, and civil wars in Greece and China signified the spread of Communism. In terms of military preparedness, the United States suffered from the constraints imposed by reduced budgets and a public unwilling to sacrifice for defense. The context of domestic politics remained the same; however, the specter of Cold War loomed with political crises of growing intensity. During this time frame, strategic reconnaissance evolved from relative neglect to a regularized, bureaucratic organization of vital interest to policy makers. Despite major advances, reconnaissance proved unable to overcome technological hurdles

¹ Sun Tzu, *The Art of War*, p. 122.

and provide the target information necessary for strategic planning.

Consequently, strategic war plans reflected a profound change in doctrine. In war plan BROILER, the Joint Chiefs of Staff continued their reliance on strategic air war, but the doctrinal basis for the plans shifted from precision bombardment to an atomic area bombing campaign. A lack of specific target information played an important role in this doctrinal transformation, although a perception of American military weakness played an even greater role. By the outbreak of the Berlin Crisis in June 1948, the United States faced a lack of strategic intelligence that compounded its shortages of men and equipment. Moreover, the Berlin Crisis awakened policy makers to the genuine possibility of war with the Soviet Union.

Even though the United States lacked the means to assess the specific Soviet military threat, many Americans grasped the growing political menace of Communism. By July 1947, US foreign policy adopted the tenets of George F. Kennan's concept of containment. Calling for a "long-term, patient but firm and vigilant containment of Russian expansive tendencies," Kennan's policy considered the Soviet Union as primarily a political, not a military, threat.² Confronted by an immense rebuilding effort to repair war damage, the Soviet economy and the Russian people were in no condition to start another war in the near future. However, Soviet involvement in Communist takeovers of the governments of Eastern Europe, Communist agitation in France, Italy, and other governments in Western Europe, and Communist leadership in nationalist movements active in European colonial empires presented alarming challenges. Therefore, the Truman Administration concentrated upon the

² [Kennan, George F.] "X," "The Sources of Soviet Conduct," *Foreign Affairs*, 25 (July 1947), p. 575.

economic challenge of a devastated Europe.³

The assumptions of containment presented American military leaders with a dilemma. The need to rebuild European economies at the same time as preserving American economic health dictated reduced defense budgets, yet the Soviet Union maintained huge armed forces. Airmen backed strategic air warfare and the atomic bomb as the solution to the problem. Simultaneously, air power advocates in the military, Congress, and the media pushed the creation of an independent Air Force as the organizational vehicle to best implement the new "air-atomic" strategy. On July 26, 1947, the National Defense Act of 1947 created the United States Air Force. With this legislation, the Air Force separated from the Army. Despite years of propaganda and lobbying, the Air Force struggled to adapt to its new found status. In practical terms, independence meant administrative overload, lost specialists (many remained in the Army), and personnel turnover as the new organizational structure formed.⁴ Thus, a mountain of administrative details absorbed the new organization at the same time as international hostility increased.

Influenced by growing political turmoil, Air Intelligence focused on the Soviet military threat related to strategic bombing. Although intelligence reports considered the outbreak of war unlikely, they acknowledged the risk of miscalculation. Of greater concern, a Headquarters, AAF Air Intelligence Report from June 1947 identified two significant trends:

1. Indications of indigenous production of advanced electronic equipment; and
2. The appearance of significant numbers of new jet fighters of

³ John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982), p. 4.

⁴ Frank Voltaggio, "Out in the Cold . . . : Early ELINT Activities of the Strategic Air Command," p. 2, File: Voltaggio, AOC.

apparently native design.⁵

Air Intelligence warned against underestimating the enemy based upon perceptions of Russian backwardness.⁶ By November 1947, Air Force Intelligence passed reports of possible Soviet atomic energy facilities near the Lake Baikal area of Siberia and the Uzbek-Kazakh area of Central Asia.⁷ In addition, intelligence briefs from September 1948 warned of increased Soviet testing of guided missiles in the Arctic; the sighting of Soviet B-29 type bombers; and Soviet exploitation of German technology to produce jet engines.⁸ In sum, preliminary air intelligence reports pointed to an enemy with significant technological potential.

In the case of SAC, the creation of an independent Air Force solved few problems. During 1947, the command continued to rebuild by reorganizing units, training individuals to form efficient combat crews and competent support teams, and filling personnel shortages.⁹ In an effort to economize, General Clement McMullen established reduced officer manning levels for the Strategic Air Command. He reasoned that using rated officers for both flying duty and for

⁵ Headquarters AAF Air Intelligence Report No. 100-146/4-34, "Operational Capabilities of U.S.S.R. in Certain Areas," Headquarters, Army Air Forces, Assistant Chief of Staff-2 (Intelligence Division) Study No. 146/4, 5 June 1947, p. 1. File number: 2-200 to 2-299 Jul 47-Aug 47, Box 39, Entry 214, RG 341, NA.

⁶ Ibid., p. 2.

⁷ Intelligence Brief No. 26, "Indications of Atomic Energy Facilities in U.S.S.R.," Headquarters, Strategic Air Command, Andrews Field, Washington, D. C., 25 November 1947.

⁸ Air Intelligence collected sightings of a Soviet version of the B-29 on 54 different occasions from June 1946 to August 1948. Intelligence Brief No. 67, "Soviet Long-Range Missiles," Andrews Air Force Base, Washington, D. C.: Headquarters, Strategic Air Command, 15 September 1948, File number 416.606-67, 15 Sep 48, USAFHRC: "U.S.S.R. Jet Engines," in Memorandum for Colonel Hugh D. Wallace from Robert Taylor, 3rd, Colonel, USAF, Chief, Collection Branch, Air Intelligence Requirements Division, Directorate of Intelligence, Subject: Distribution of Studies, 8 March 1948, TS Control number: 2-8389, File number: 2-8300 to 2-8399, Box 45, Entry 214, RG 341, NA; "The Russian B-29," in memo to Wallace, NA.

⁹ Historical Section, Strategic Air Command *The Strategic Air Command 1947*, Vol. 1: *Narrative* ([Offutt Air Force Base, Nebraska]: 1 June 1949), p. 1. File number 416.01,v.1, 1947, USAFHRC

administrative positions would develop career officers with broad experience.¹⁰

Although McMullen's plan appeared sound on paper, assigning significant administrative duties to inexperienced flyers resulted in disaster.

Overburdened, demoralized flight crews failed to achieve desired proficiency levels in either area. Despite personnel problems, SAC viewed the arrival of new aircraft as a sign of hope. By 1948, small numbers of new B-50 and B-36 bombers entered the inventory. Although SAC's bomber force reached 530 total aircraft by the end of 1948, personnel shortages and managerial errors sapped the command of combat effectiveness.¹¹ Thus, the creation of an independent Air Force did not prove a panacea.

Considered a second-priority mission by the SAC bomber force, strategic aerial reconnaissance reached a nadir in the transition to Air Force independence. The SAC aircraft inventory reflected a continued decline in SAC reconnaissance aircraft from even the low level of 1946. The fifty-five SAC reconnaissance planes of January 1947 declined to only twenty-four by September 1947.¹² Additionally, General McMullen's Manning policies capped

¹⁰ In the Air Force, pilots and navigators possess aeronautical ratings and are referred to as "rated" officers. *Ibid.*, p. 56.

¹¹ The SAC bomber force included the following aircraft: 22 B-36, 17 B-50, 426 B-29, 3 B-17, 46 B-25, 8 B-26, and 8 others. SAC Technical Manual 122-1, *Command Summary*, Strategic Air Command, December 1948, p. 23, File number: 416.01, 1948, v. 8, USAFHRC.

¹² By October, the reconnaissance inventory increased slightly, but, the 311th Reconnaissance Wing's flying squadrons only listed 39 aircraft of the following types:

7th Geodetic Control Sq -- 13 total: 1 B-29, 2 F-9, 1 F-13, 2 OA-10, 7 C-47

16th Photo Sq -- 9 total: 1 B-25, 1 F-2, 3 F-9, 3 F-13, 1 C-54

343rd Recon Sq -- 17 total: 10 B-17, 1 F-2, 6 F-9.

Statistical Control Office, Strategic Air Command, *Statistical Summary Strategic Air Command*, 1 October 1947, p. 31 in *The Strategic Air Command 1947*, Vol. 7: *Statistical Summaries (Part II)*. File number 416.01, v. 7, 1947, USAFHRC.

reconnaissance personnel strength at minimal levels.¹³ Although aircraft strength improved in 1948, aerial reconnaissance continued as a peripheral concern for the independent Air Force.

During 1948, commanders at SAC and Air Force Headquarters raised the questions which eventually led to the formal establishment of a peacetime aerial reconnaissance program. Upon his return from the SANDSTONE nuclear tests in June 1948, Brigadier General P. T. Cullen, commander of SAC's 311th Air Division, recommended a study of reconnaissance by SAC Headquarters.¹⁴ With the rapid development of atomic and biological weapons, Cullen believed the reconnaissance techniques of World War II no longer sufficed in the "Atomic Age." Modern warfare did not permit the development of tactics and equipment during a war's early stages. According to General Cullen, operations analysts and other experts must study the "tactics, techniques, operations, and tools of reconnaissance."¹⁵ He also suggested the study of movie, high-speed recording equipment, atomic photography, and other technologies to produce systems capable of fulfilling wartime demands.¹⁶

¹³ SAC established the following manning limits for the 311th Reconnaissance Wing:

Unit	Officers	Warrant Officers	Enlisted Men
Hq 311th Rcn Wing	20	2	48
Hq 55th Rcn Gp VLR	14	-	60
343rd Rcn Sq VLR	54	1	396
6th Photo Tech Unit	2	1	50
10th Photo Tech Unit	32	1	305
11th Photo Tech Unit	2	1	50
7th Geodetic Control Sq	155	-	540
16th Photo Sq (Sp)	(1)	-	(1)
36th AAF Base Unit	28	-	100

SAC Statistical Summary, 1 Oct 1947, p. 32, USAFHRC.

¹⁴ The 311th Reconnaissance Wing was upgraded to an Air Division in early 1948.

¹⁵ Letter, P. T. Cullen, Brigadier General, USAF, Commanding, Headquarters, 311th Air Division, Reconnaissance, to Commanding General, Strategic Air Command, Subject: Proposal for Study of Reconnaissance, 4 June 1948, in *History Strategic Air Command 1948*, Vol. 4: *Supporting Documents*, File number: 416.01, v. 4, 1948, USAFHRC.

¹⁶ Letter, Cullen to CG, SAC. Subj.: Proposal for Study of Reconnaissance, 4 Jun 47.

When no action appeared by September 1948, General Cullen backed his position emphatically:

I am enclosing a copy of my original letter and once more would like to recommend that a vigorous program be initiated immediately. I think our reconnaissance techniques are antiquated, I think our equipment is inadequate and insufficient, but I hesitate to make positive recommendations regarding new equipment without analysis of the entire field.¹⁷

Furthermore, Cullen proposed the use of ultra-violet and infrared rays to gather information either as independent methods or in conjunction with conventional photography. He also speculated that television might enhance night photography. Regardless of the validity of these ideas, Cullen argued for SAC guidance in analyzing reconnaissance: "This, I believe, is recognized by the various agencies of your (McMullen's SAC) Headquarters but very little specific action or thought seems to be taking place. Frankly this disturbs me a great deal."¹⁸

Joining Cullen's critique of SAC reconnaissance concepts, Major General Earle E. Partridge, Director of Training and Requirements, urged a fundamental rethinking of strategic aerial reconnaissance. In a memorandum to the Director of Air Force Intelligence, Major General George C. McDonald, Partridge observed, "The scope of the reconnaissance needed to carry out atomic bomb attacks in Russia staggers my imagination. Some means must be devised to narrow this field to the point where a reasonable number of missions

¹⁷ Although General Cullen suggested new ideas, he believed that "those of us who are directly involved in reconnaissance operations are so occupied with the ever present problem of personnel and training, that we have little opportunity to survey the field of industry for new techniques." Letter, P. T. Cullen, Brigadier General, USAF, Commanding, Headquarters, 311th Air Division to Major General Clement McMullen, Headquarters, Strategic Air Command, 8 September 1948 in *History Strategic Air Command*, Vol. 4, USAFHRC.

¹⁸ Ibid.

can accomplish the objectives."¹⁹ Partridge disputed the Air Force decision to extend World War II methods by gradual technical improvements. Instead, he suggested that long-range daylight photographic missions in good weather might prove impossible. Enemy fighter opposition and the present inability to forecast weather threatened existing reconnaissance methods.²⁰ Moreover, he raised three penetrating questions:

- a. Are we right in sticking to a plan for photographing our targets in daytime? As you know, the Russian winter provides little useable [sic] photographic weather.
- b. Should we go entirely to radar scope photography and to radar mapping for location of targets? Our experts agree that visual bombing at high altitudes at high speed is practically out. Maybe we should concentrate on improvement of our radar so that accurate mapping can be done by that method alone.
- c. Should we change our bombardment doctrine so that every atomic bomb mission will be a search attack?

Partridge observed that the Air Force was spending hundreds of millions of dollars on individual items of equipment without a comprehensive plan to employ them.²¹ In response to General Partridge's questions and comments, the Air Staff surveyed Air Force reconnaissance.

As a first step in developing an Air Force strategic reconnaissance plan, the Air Staff assessed the current state of strategic intelligence. The study concluded that target photography from World War II German sources existed for areas south and west of the line Leningrad-Kazan-Astrakhan-Baku. Unfortunately, coverage of the remainder of the Soviet Union remained sparse.

¹⁹ Memorandum for General McDonald from E. E. Partridge, Major General, USAF, Director of Training and Requirements, Subject: Strategic Reconnaissance, 31 January 1948, TS Control number 2-848, File: 2-800 to 2-899 Jan 48, Box 40, Entry 214, RG 341, NA.

²⁰ Ibid.

²¹ Ibid.

At current levels of technology, radar mapping did not provide sufficient image definition for targeting and the survey did not anticipate radar's use for basic intelligence collection in the near future.²² Although the survey offered no solutions, it joined Cullen and Partridge in defining the reconnaissance problem.

Up until mid-1948, Air Force aerial reconnaissance lacked direction. Concerned with acquiring desperately needed information, theater commanders adopted *ad hoc* collection efforts.²³ Although the Directorate of Intelligence at Headquarters Air Force was in charge theoretically, in practice, intelligence collection remained decentralized. Therefore, Cullen's appeal for reconnaissance study and Partridge's critique of existing reconnaissance concepts sparked an effort to organize Air Force reconnaissance.

Prompted by Cullen and Partridge, a series of policy letters established formal requirements for Air Force strategic intelligence.²⁴ On January 28, 1948, General McDonald presented a brief of strategic reconnaissance operations "which must be executed before the Air Force can undertake successful air operations against the enemy."²⁵ Entitled "Requirements for Strategic

²² Enclosure 1, "Strategic Reconnaissance Necessary for Implementing Long Range Bombardment," in Letter, George C. McDonald, Major General, USAF, Director of Intelligence, Office of Deputy Chief of Staff, Operations, to Director of Training & Requirements, 19 Feb 1948, TS Control number: 2-848, File: 2-800 to 2-899 Jan 48, Box 40, Entry 214, RG 341, NA.

²³ On December 14, 1946, the Joint Chiefs of Staff agreed to continue the World War II practice of organizing operational units stationed outside the continental United States into unified theater commands. The Air Force components of the three theater commands were the Alaskan Air Command (AAC), the United States Air Forces in Europe (USAFE), and the Far East Air Forces (FEAF). In practice each Air Force theater commander retained a considerable amount of autonomy. *Futile Ideas, Concepts, and Doctrine*, pp. 195-196.

²⁴ Letters to the Commanders of the Strategic Air Command and the Alaskan Air Command were sent on 29 March and 14 May 1948. Memorandum for Record, "To present an electronic intelligence requirement," n. d. IS Control number 2-1585, File number: 2-1500 to 2-1599, Box 41, Entry 214, RG 341, NA.

²⁵ Letter, George C. McDonald, Major General, USAF, Director of Intelligence, Office of Deputy Chief of Staff, Operations, to Director of Training and Requirements, Subject: Transmittal of Intelligence Requirements, 29 Jan 48 TS Control number: 2-823/3, File number: 2-800 to 2-899 Jan 48, Box 40, Entry 214, RG 341, NA.

Reconnaissance of the U.S.S.R. and Satellite States," the program outlined requirements for photographic and electronic intelligence and identified the priority targets for photographic coverage. The document stressed photographic intelligence for selecting and evaluating strategic target systems and for preparing strategic target material for operational units.²⁶ In addition, the plan called for electronic reconnaissance to "determine the exact location, density, and effectiveness of early warning nets of radar or other electro-magnetic character" and to investigate radio transmissions which might be used to control guided missiles or pilotless aircraft.²⁷ Air Intelligence established the following list of areas for photo reconnaissance (in priority order):

- a. Industrial area of the Urals (no cover at present).
- b. Industrial area of Kuznetsk Basin (no cover at present).
- c. Industrial areas of Dnepr and Don Basins (1941-43 cover now available).
- d. Central Industrial Region (centered about Moskva (1941-45 cover now available).
- e. Stalingrad-Kuybyshev (sic) Industrial Area (1941-43 cover now available).
- f. Leningrad Industrial Area (1941-43 cover now available)
- g. Industrial Area of Fergana Valley in Uzbek A.S.S.R. and Kirgis S.S.R. (no cover at present).
- h. Petroleum areas of Caucasus and Caspian (1941-45 cover now available).
- i. Khabarovsk-Vladivostok Area (no cover at present).
- j. Uncovered Strips of the Trans Siberian Railway.
- k. Industrial Areas of Karaganda (no cover at present).
- l. Industrial Area of Alma Ata, Kazakhstan (no cover at present).
- m. Industrial Areas of Western White Russian S.S.R. (1941-45 cover now available).
- n. Northern Regions, Including Archangelsk, Kola Peninsula, and Pechora Valley (spotty 1941-43 cover at present).

²⁶ Enclosure 1, "Requirements for Strategic Reconnaissance of the U.S.S.R. and Satellite States," in *Ibid.*

²⁷ Enclosure 1, "Requirements of Strategic Reconnaissance of the U.S.S.R. and Satellite States," in Letter, George C. McDonald, Major General, USAF, Director of Intelligence, Office of Deputy Chief of Staff, Operations, to Director of Training and Requirements, Subject: Transmittal of Intelligence Requirements, 28 Jan 48, TS Control number: 2-823/3, File number: 2-800 to 2-899, Box 40, Entry 214, RG 341, NA.

o. Industrial Area of Magadan in eastern Siberia (no cover at present).²⁸

Ideally, photographic reconnaissance would provide coverage at a minimum scale of 1:10,000 for principal industrial cities and 1:20,000 for major rail lines.²⁹ Along the same lines, the brief directed electronic reconnaissance around the perimeter of the USSR and satellite states and in the vicinity of strategic industrial and population centers. The report cited the Russo-European land mass and the maritime areas of the Far East between Korea and the Bering Strait as areas of greatest interest.³⁰ By establishing formal intelligence requirements, Headquarters, USAF provided guidance and direction missing from previous intelligence efforts. In addition, the articulation of intelligence requirements focused Air Force thinking on the capabilities and need for reconnaissance. By addressing these issues, the Air Force established the vital first link in the intelligence cycle.³¹

The Soviet Union's emergence as a potential military threat prompted SAC interest in potential surprise attack. SAC commander, General George C. Kenney, worried about Soviet atomic potential. Disagreeing with earlier AAF assessments, he viewed the atomic bomb as the decisive weapon:

When we consider that 100 atom bombs will release more foot pounds of energy than all the TNT bombs released by all the belligerents of World War II combined . . . and that that effort could be put down in a single attack, it is evident that the long drawn out war is out of date. When it is further considered that probably 80 percent of World War II's bombs were wasted, 100 atomic bombs would cause at least four times the destruction. . . . No nation, including our own, could survive such a blow.³²

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

³¹ The intelligence cycle refers to the process by which information is converted into intelligence and made available to users. There are five steps in the cycle: planning and direction, collection, processing, production, and dissemination. JCS Pub 1, *Dictionary of Military and Associated Terms*, p. 189.

³² *Strategic Air Command 1947*, Vol. 1, p. 138, USAFHRC.

Kenney's strategic concept emphasized a short destructive war that would be over in a few days. He considered the bombing of targets that would affect enemy production in a few months to be "meaningless." Kenney's SAC regarded the advantage gained by a surprise attack as "so great that it can almost be considered decisive. I believe this should be studied analyzed and discussed far more than we are doing today."³³ As a result, the Strategic Air Command focused on the vast, uninhabited expanse of the Arctic as offering the greatest potential for surprise attack. Whether as a route of SAC bombers or as an avenue for a Soviet atomic strike upon the United States, the potential for surprise directed SAC attention to trans-Polar operations.

Aerial reconnaissance played a vital role in transforming polar operations from theory to reality. Before SAC bombers could use Arctic routes, reconnaissance aircraft had to overcome formidable challenges. First, navigators faced tremendous obstacles in the combination of vast, uncharted areas, featureless terrain, magnetic disturbances, and celestial anomalies.³⁴ As a result, the 46th Reconnaissance Squadron deployed to Ladd Field, near Fairbanks, Alaska, to explore and map the Arctic.

From August 1946 until September 1948, SAC reconnaissance aircraft tested the feasibility of trans-Polar operations. Before the deployment, little was known about Arctic flying except for the perils of a small band of early aviators who braved the elements in open-cockpit planes. Following World War II, the Research and Development Branch of the War Department General Staff

³³ *Strategic Air Command 1947*, Vol. 1, p. 139, USAFHRC.

³⁴ To compensate for the difficulties of using a magnetic compass in polar regions, the Air Force developed gyro-stabilized, electric compasses and grid navigation techniques. For an in-depth look at the problems of polar navigation see chapter 17 of Air Force Manual 51-40, *Air Navigation*, Departments of the Air Force and Navy (Washington: Government Printing Office, 15 March 1983), pp. 17-1 -- 17-12.

initiated Project No. 5 to explore the frozen North. Approved by both Chief of the Air Staff, General Spaatz, and Army Chief of Staff, General Eisenhower, the Air Staff instructed SAC to accomplish the photomapping and electronic reconnaissance required.³⁵

Under the auspices of Project No. 5, the 46th Reconnaissance Squadron solved many of the navigational problems involved with Arctic flying. Originally composed of aircraft and crews assigned to SAC, the 46th Reconnaissance Squadron conducted the most ambitious photomapping projects to date. In Operation FLOODLIGHT, reconnaissance crews searched uncharted Arctic waters for new land masses that might be used for future bases or weather stations. Sorties from Ladd AFB, Alaska attempted to map Area "A" (between 160 and 180 degrees East longitude and 73 and 77 degrees North latitude), Area "B" (north and east of Area A), Area "C" (the route between Alaska and Iceland), and Area D (the area between 85 degrees North latitude and the North Pole, except for a portion of northeast Greenland).³⁶ As a result of FLOODLIGHT, the F-9s of the 46th Reconnaissance Squadron discovered "Target X," a floating ice mass roughly 14 x 17 miles in size, which provided considerable oceanographic information about the Arctic.³⁷ Reconnaissance crews also established scheduled air service between Ladd Field, Alaska to Iceland in Operation POLARIS.³⁸ By May 1947, SAC added Operation

³⁵ Routing and Record Sheet (hereafter abbreviated R & R), Hq USAF - AFOIR-RC to CSGID, Subject: Photography of Floodlight (Project No. 5), Nov 18, 1948, TS Control number: 2-5373, File number: 2-5600 to 5699, Box 43, Entry 214, RG 341, NA.

³⁶ *History Strategic Air Command 1948*, Vol. 1, pp. 248-249.

³⁷ Memorandum for Chief, Air Intelligence Requirements Division from Carl M. Green, Major, USAF, Reconnaissance Branch, Air Intell Requirements Div, Directorate of Intelligence, Subject: Coordination of Photo and Photo Intelligence Activities, 11 December 1947, TG Control number: 2-682, File number: 2-600 to 2-699, Box 40, Entry 214, RG 341, NA; Memorandum for Record, Problem: Coordination and Dissemination of Aerial and Radar Scope Photography by the Alaskan Air Command with Hq AAF, Air Intelligence Div., n. d., n. p., TS Control number 2-450, File number: 2-400 to 2-499, Box 39, Entry 214, RG 341, NA.

³⁸ Ibid. & *History Strategic Air Command 1948*, Vol. 1, p. 248.

EARDRUM, the trimetrogon photomapping of Greenland, to the tasks of aerial reconnaissance.³⁹ In each of these projects, reconnaissance crews gathered weather data, searched for potential emergency landing fields, recorded magnetic and electronic phenomena, and experimented with various navigational techniques.⁴⁰ By September 1948, the 46th/72nd Reconnaissance Squadron flew 103 missions, 1,500 flying hours, including seventeen flights over the North Pole, and explored 829,000 square miles of polar ice cap. Although perhaps less heralded, Project No. 5 also involved twelve air aborts, forty-three ground aborts, two crashes, and three fatalities.⁴¹

Of equal importance to Arctic exploration, two additional reconnaissance projects sought photographic information on the Soviet threat. In Project 20, aircraft flew semi-monthly surveillance missions from Point Barrow to the tip of the Aleutian chain by way of the Bering Strait. Crews photographed any unusual object or activity for intelligence purposes.⁴² Moreover, Project 23 combined ELINT and photography. For each mission, two aircraft flew along the Siberian coast adjacent to Alaska. One aircraft flew at high altitude "directly over the coastline" while the second plane flew a parallel course several miles out to sea. Although the primary electronic intelligence mission gathered valuable radar information, the oblique photos from K-20 aerial cameras

³⁹ In early 1948, the Air Force redesignated the 46th Reconnaissance Squadron as the 72nd Reconnaissance Squadron and transferred the unit to Alaskan Air Command control. Letter, Kenneth P. Bergquist, Colonel, Air Corps, Deputy Asst. Chief of Air Staff to Commanding General, Strategic Air Command, Subject: Operation EARDRUM, 3 Mar 1947 in *Strategic Air Command 1947*, Vol. 4, Tab 113, USAFHRC.

⁴⁰ Letter, Enos L. Cleland, 1st. Lt., Air Corps, Flight "B" Commander to Commanding Officer, 46th Recon Sq (VLR) Photographic, Subject: Progress Report for Flight "B," 30 July 1947 in Historical Section, Strategic Air Command, *The Strategic Air Command 1947*, Vol. 4: *Supporting Data (Operations)* ([Offutt AFB, Ne.]: 1 June 1949), Tab 116. File number: 416.01, v. 4, 1947, USAFHRC.

⁴¹ *History Strategic Air Command*, Vol. 1, p. 249.

⁴² Memorandum for Chief, Air Intell Requirements Div. from Green, Subj.: Coordination of Photo, 11 Dec 47, NA.

provided poor pictures and little usable information.⁴³

Adding to the frustration caused by poor long-range photography, a Project 23 sortie caused a Soviet diplomatic protest that illustrated the political limitations of aerial reconnaissance. On January 5, 1948, Soviets protested the US Air Force reconnaissance activity in the Arctic with the following note:

The Embassy of the Union of Soviet Socialist Republics presents its compliments to the Department of State and has the honor to communicate the following:

On December 23, 1947 at 14 hours and 15 minutes an American airplane violated the Soviet frontier in the region of Cape Chukotsk, flying for about seven miles along the coast of the Chukotsk Peninsula at a distance two miles from the shore.

In communicating the foregoing, the Embassy, upon instructions of the Soviet Government, requests that the case under reference of a violation of the Soviet frontier by an American airplane be investigated and that measures be taken not to permit such violations in the future.⁴⁴

The US Department of State asked the US Air Force for an explanation. Project officers at the Air Staff traced the violation to Project 23 Mission Number 7 M 263A. In conjunction with the Alaskan Air Command, the investigation revealed that the aircraft violated a restriction of flights closer than twelve miles to Soviet territory mandated by the Department of State; however, no means existed to determine whether the plane had violated the Soviet frontier as alleged.⁴⁵ Nevertheless, the incident revealed Soviet radar's ability to track peripheral Ferret flights. Although the Soviet protest resulted in political embarrassment

⁴³ Ibid.

⁴⁴ Soviet Note No. 261, Embassy of the Union of Soviet Socialist Republics, January 5, 1948, TS Control number: 2-934, File 2-900 to 2-999, Box 40, Entry 214, RG 341, NA.

⁴⁵ The existing documents for the incident present conflicting information regarding the border restriction for Project 23. Documents that resulted from the investigation of the incident confirm that the pilot violated the Department of State limitation of twelve miles from the Soviet coast as shown in Letter, AFOIR-CM to Commander-in-Chief, Alaska, Subject: Violations of Soviet Frontier, n. d., TS Control number: 2-934, File: 2-900 to 2-999, Entry 214, RG 341, NA. Yet, a memo explaining Alaskan photographic efforts stated that the AAC had no boundary restrictions when this sortie was flown. See MFR, Subject: Photographic Coverage -- Chukotski Peninsula, n. d., TS Control number: 2-1378, File: 2-1300 to 2-1399 (1948), Box 41, Entry 214, RG 341, NA.

for the United States and the US Air Force, it also foreshadowed future trouble over strategic aerial reconnaissance.

The early Arctic reconnaissance missions proved valuable both for their significant accomplishments and for revealing limits to aerial activity in northern regions. Throughout the period, aerial reconnaissance missions collected data that added to basic scientific and geographic knowledge of the Arctic. In addition, Air Force personnel pioneered cold weather operations. Encountering severe obstacles posed by extreme temperatures, nonexistent weather forecasts, long-periods of twilight that hindered celestial navigation, and other problems, the crews tackled the most difficult flying conditions imaginable.⁴⁶ Not the least of the problems encountered, psychological stresses taxed the aircrews. In 1947, the flight surgeon of the 28th Bombardment Group (assigned to Ladd AFB, Alaska) noted marked deterioration in the morale and performance of the aircraft crews:

It is not believed that the extreme cold itself increased the mental stress and strain of our flying crews; however, the types of terrain over which they were flying did. The terrain being vast, uncharted, very sparsely populated, with inherent navigational difficulties plus over-water flying and frequent icing conditions increased the stress of flying in Alaska. Survival in some areas would be impossible for long periods of time. The crews had very little confidence in the adequacy of Air-Sea rescue . . .⁴⁷

Finally, Arctic weather conditions set absolute limits to polar flying. Following a January 1947 crash in a take-off attempt at -50° F, the AAC restricted flying operations below -35° F.⁴⁸ By the conclusion of the projects, SAC valued the vast amount of information gathered by its reconnaissance crews in the Arctic,

⁴⁶ Letter, Cleland to 46th Recon Sq, "Progress of Flight B," 30 Jul 47 in *Strategic Air Command 1947*, Vol. 4, Tab 116; *Strategic Air Command 1947*, Vol. 1, p. 141, USAFHRC.

⁴⁷ *Strategic Air Command 1947*, Vol. I, p. 145, USAFHRC.

⁴⁸ Ibid., p. 140.

but the Alaskan experience demonstrated sobering limits to Air Force capability. One report concluded:

One of the large lessons learned in this winter's operations in Alaska is that AAF knows how to operate aircraft in flight at any temperature, but it does not know how to preserve and maintain aircraft on the ground at extreme temperatures with limited facilities.⁴⁹

If the photomapping sorties sought information basic to Arctic operations, SAC polar Ferrets explored the unknown capabilities of Soviet Arctic defenses. Captain Les Manbeck coordinated the modification of a B-29 for ELINT purposes to follow the SAC B-17 Ferret that came up empty-handed over Greenland. In late 1947, Captain Manbeck arranged for Mr. Jim Scott and Captain Robert R. Perry to prepare a B-29 Ferret for January 1947.

The first B-29 Ferret represented a significant technological advance over the previous "jury-rigged" aircraft. In addition to the increased range of the B-29, the new Ferret included equipment able to span a wider portion of the electronic spectrum. To accommodate the added electronics, technicians removed the B-29's guns and converted the rear pressurized section to an electronic intercept station. The conversion also transformed the bomb bay into additional fuel storage tanks.⁵⁰ The ELINT B-29 featured a thirteen-man crew, including two pilots, three navigators, six Ravens, a radio operator, and a flight engineer.⁵¹ The Raven crew consisted of three positions that operated search and analysis equipment and three positions dedicated to direction-finding.⁵²

⁴⁹ Zimmerman, Carroll L., "Trip to Alaska," Office of Operations Analysis, 10 Feb 1947 in *Strategic Air Command 1947*, Vol. 4, Tab 112.

⁵⁰ Although B-29s modified for photographic or ferret missions were designated RB-29s in 1948, the first B-29 ferret was simply referred to as an ELINT B-29 or "the prototype B-29 ferret." Interview, Joe Wack, Colonel, USAF (ret.) by Alfred Price, n. d., p. 10, File 11: Col J. Wack, AOC.

⁵¹ *Ibid.*, p. 12.

⁵² Letter, H. C. Monjar to Frank Voltaggio, 10 June 1982, File 59: Lt Col H. Monjar, AOC; Voltaggio, "Out in the Cold . . .," pp. 8-9, File: Voltaggio, AOC.

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PLATE 1

RB-29A

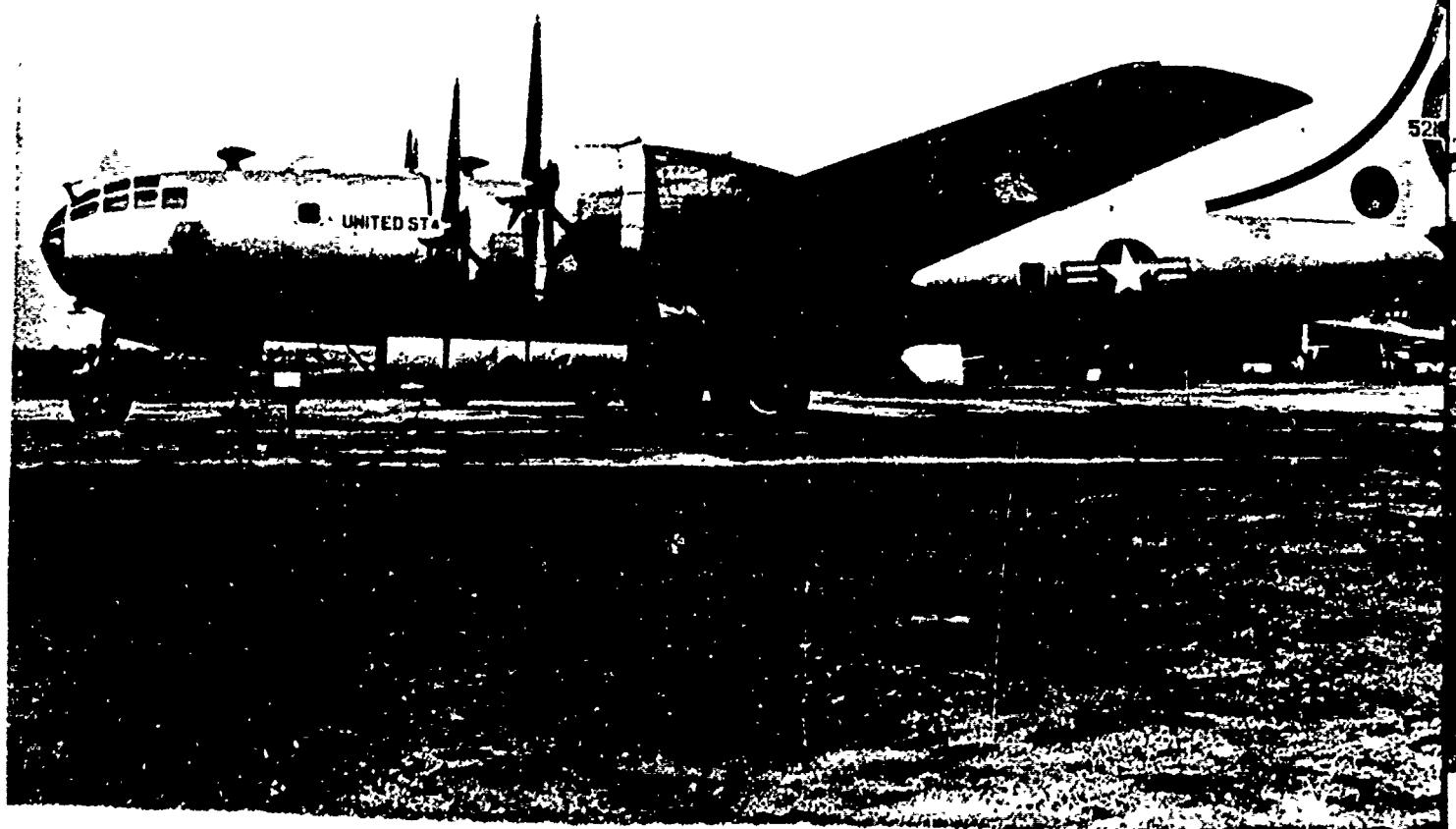
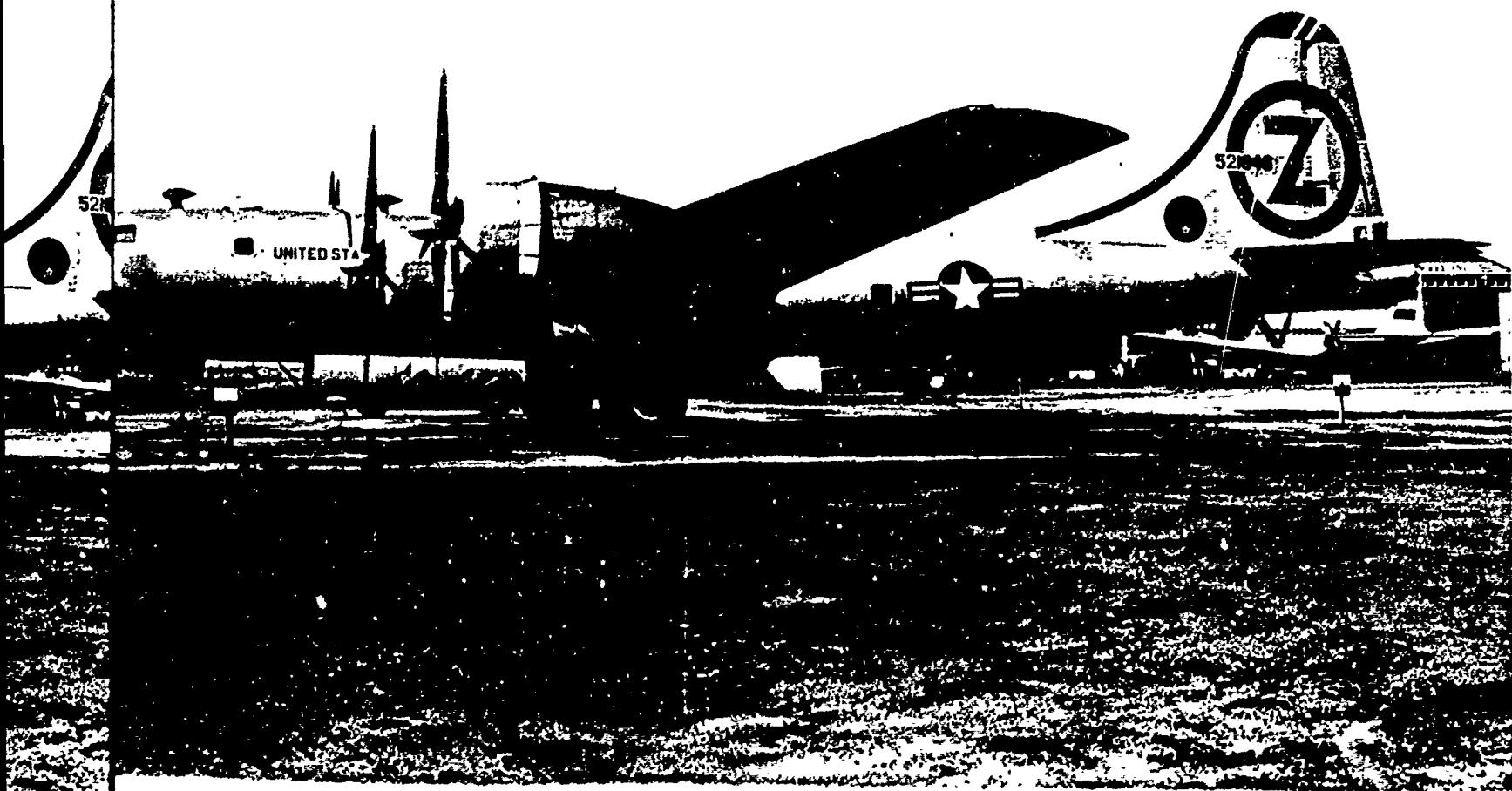


PLATE 1

RB-29A



Captain Perry worked with Mr. Scott and the Wright Air Development Center team to enhance the human factors layout of the equipment, i. e. to place equipment within reach of the operator.⁵³

Before deploying the Alaska, the ELINT B-29 crew trained at Wright Field, Dayton, Ohio for Ferret operations. Under the command of Captain Landon Tanner, the command pilot, and Captain Robert R. Perry, the senior Raven, the crew flew familiarization sorties over Ohio. The Ravens operated their search receivers to intercept radars and analyze their frequency, pulse repetition frequency (PRF), pulse length, scan rate, and other characteristics.

Furthermore, the new Ravens learned to take direction-finding (D/F) bearings and plot them with assistance of the navigators.⁵⁴ By March 1947, the crew proceeded to Andrews AFB where Major Guiton of the AAF's Research and Development Branch of the Pentagon explained that their mission would be to fly long-range Ferret missions north of Siberia.⁵⁵ Following the briefing, the ELINT B-29 proceeded to Ladd AFB, Alaska. Captain Perry explained that the vagueness of their assigned task complicated mission planning:

My orders were explicit enough in giving us first priority on fuel, maintenance and support at all USAAF world-wide, but vague enough to allow us to file a clearance and fly anywhere in the world we wanted to go. Now this may seem funny, but I never got a briefing on what they wanted us specifically to do in Alaska. Maybe somebody else did, but I never got one, and I was the project officer . . .⁵⁶

⁵³ Interview, Colonel Robert R. Perry, USAF (ret.) by Alfred Price, p. 9, File 31: Cdr R. Perry, AOC

⁵⁴ In addition to Captain Perry, the other Ravens were.

First Lieutenant Joseph H. Wack

First Lieutenant Harry A. Lehmann

First Lieutenant Walter A. Spindler

First Lieutenant Henry C. Monjar

Second Lieutenant Walter M. Hudek

Voltaggio, "Out in the Cold . . .," p. 8, File: Voltaggio, AOC; Wack, AOC 11, p. 11.

⁵⁵ Wack, AOC 11, p. 11, AOC.

⁵⁶ Voltaggio, "Out in the Cold . . .," p. 11, File: Voltaggio, AOC

Nobody gave me a briefing on what was where or what they wanted or anything. They just said 'Go and see what radars are there.'⁵⁷

Officially designated "B-29 #812," and nicknamed "Sitting Duck" by its crew, the B-29 Ferret probed the Siberian coast for signs of Soviet radar. From June 11 to August 21, 1947, the "Sitting Duck" flew nine reconnaissance sorties, first along the northern coast of Siberia and then along the southern edge.⁵⁸ Prior to the Ferret flights, the Air Force had no information on Soviet radars in this area. After the B-29 Ferret exploration, the crew uncovered a chain of scattered Soviet RUS-2 early warning radars along the southern periphery of the Soviet Far East and the absence of Soviet radars along the USSR's Arctic coast.⁵⁹ In addition, the plane's navigators discovered the existence of three uncharted ice islands. According to Captain Perry, the crew inadvertently drifted into Soviet territory on one sortie:

On one of those missions we were supposed to make a little dip into Anadyr Bay, which is a big bay maybe 120 miles wide and 120 miles deep . . . we were just supposed to make a little "V" into it. All of a sudden I looked at the radar and I called up Kelly (the radar navigator). I said, "Kelly we're over land!" He says, "I know it." I said, "Why don't we get the hell out of here?" I said, "Flanagan (1st navigator), what the hell are we doing?" Flanagan said, "Well, we've hit a reverse jet stream and we're trying to get out. It's carried us inland about 50 miles and we're making about 20 knots ground speed trying to get out."⁶⁰

Eventually, Headquarters USAF passed instructions to the Commanding General of the Alaskan Air Command that prohibited flights closer than fifteen

⁵⁷ Perry, AOC 31, p. 9.

⁵⁸ This total does not reflect training and ferry missions. See AAF Forms 5A, Individual Flight Record attached to Voltaggio, "Out in the Cold . . .," File: Voltaggio, AOC.

⁵⁹ Wack, AOC 11, pp. 12-13.

⁶⁰ Voltaggio, "Out in the Cold . . .," p. 12, File: Voltaggio, AOC.

miles to Soviet territory.⁶¹

The Alaskan reconnaissance sorties demonstrated the value of the B-29 Ferret. The aircraft's long range allowed coverage of the vast distances encountered in the Arctic and northern Pacific and the data gained by the ELINT crew established the initial Electronic Order of Battle (EOB) for the Soviet Far East.⁶² The flights revealed weaknesses in Soviet radar defenses along the Arctic Circle. As polar flying experience and advances in navigation technology reduced the uncertainty of Arctic operations, Alaskan reconnaissance operations confirmed the validity of Polar routing for SAC's new long-range B-50 and B-36 bombers.

Like the Alaskan sorties, European Ferret flights gathered information of interest to Air Force planners. During the first half of 1947, periodic B-17 Ferret flights ranged from the Baltic to the southern tip of Greece in order to expand the radar information collected the previous year. The ferrets identified nine new radar stations and two guided-missile launching sites in Yugoslavia and observed 8,000-foot runways on Gotland Island in the Baltic.⁶³ Although of intelligence interest, the latter information revealed flaws in the collation and dissemination of Air Force intelligence data. On July 23, 1947, General George

⁶¹ The documents available do not specifically link the Headquarters, Air Force action to the Ferret overflight. Instead, the documentary trail stops at an August 16, 1947 request from the Commanding General, Alas' n Air Command for special instructions regarding boundaries. Staff Summary Sheet for Deputy AC/AS-2, Subject: Re issuance of instructions regarding operation of two 46th Recon Sqdn A/C now being fitted w/RCM ferret equipment, 20 August 1947, TS Control number: 2-296, File number: 2-200 to 2-299 Jul 47-Aug 47, Box 39, Entry 214, RG 341, NA

⁶² The term "Electronic Order of Battle" refers to a list of enemy radars and other electronic equipment that catalogues the location and characteristics of the equipment for intelligence and mission-planning purposes

⁶³ The documents do not elaborate on what type of missile launchers were noted and they do not explain why the Air Staff wanted pictures of the airfields, since Gotland Island is Swedish territory. Memorandum for Deputy, Assistant Chief of Air Staff-2 from George C. McDonald, Major General, U.S. Army, Assistant Chief of Air Staff-2, Subject: Ferret Operations, 23 July 1947, TS Control number: 2-196, File: 2-100 to 2-199 Jun 47-Jul 47, Box 39, Entry 214, RG 341, NA.

C. McDonald, Assistant Chief of the Air Staff for Intelligence, dispatched a blistering memorandum that demanded the prompt reporting of Ferret results.^{**} Additionally, McDonald instructed that photographic equipment be installed on RCM aircraft if space permitted.^{**} A cable from General Spaatz to Lieutenant General Curtis E. LeMay, Commanding General of the US Air Forces in Europe, suggested that photo reconnaissance aircraft should follow-up Ferret sightings. Both McDonald and Spaatz expressed dismay that no photographs were taken of the Gotland Island runways. Nevertheless, General Spaatz emphasized that the primary mission of the Ferret "should not be curtailed for photos as all material being received from this project is vital. . . . Results so far are considered very good and continued operations to the fullest extent is urged as dictated by existing flying restrictions, rules and regulations and safety factor for both personnel and equipment."^{**}

Whereas flights over the Arctic involved only the United States and the Soviet Union, reconnaissance missions in Europe raised complex diplomatic issues. Although the United States needed information gathered by aerial reconnaissance, the potential for international incidents involving Ferret aircraft caused the Air Force to coordinate flights with the State Department. In July

^{**} Evidently, General McDonald learned of the European Ferret activity second hand. He directed the immediate reporting of Ferret data to the Air Intelligence Requirements Division for "proper evaluation." In addition, he insisted that all Ferret activities should follow these procedures to include Alaska, Far East Air Forces, and "such places in the future where we may operate." Ibid.

^{**} Memorandum for Record, Major Langbehn, 24 July 1947, Subject To prepare cable to USAFE requesting information as to Photo material and whether photos were being taken of Targets of Opportunity during Ferret operations, TS Control number 2-221, File 2-200 to Jul47-Aug 47, Box 39, Entry 214, RG 341, NA.

^{**} Cable, COMGENUSAFFE, Wiesbaden Germany from AFACE signed Spaatz, 24 July 1947, TS Control number 2-221, File 2-200 to 2-299 Jul 47-Aug 47, Box 39, Entry 214, RG 341, NA.

1947, the State Department sanctioned three sorties over the Baltic Sea.⁶⁷ Although the Air Force persuaded State to accept future flights, the State Department worried that additional flights would antagonize friendly states in the area. Therefore, General Spaatz advised the Commanding General of USAFE to delay further Baltic missions until the arrival of the prototype B-29 Ferret in September.⁶⁸ When the Air Force briefed officials at the State Department of the information being collected, State agreed to further missions as long as the aircraft remained over water and approached Soviet-occupied territory no closer than twelve miles.⁶⁹ Unfortunately, although the State-Air Force discussions appeared satisfactory, the State Department offered no assistance to repatriate air crews in the event of their force down and capture.⁷⁰ The implications of this action contributed to the Air Force decision to curtail B-17 Ferret activity and wait for the ELINT B-29.

Compared to the *ad hoc* origins of previous Ferret projects, the B-29 Ferret's "European tour" reflected the desires of the Air Staff in Washington. First suggested in late July, General Earle E. Partridge, Assistant Chief of the Air Staff for Plans, coordinated the B-29's transfer to Europe following its Alaskan missions. He proposed a thirty-day deployment that included two flights to the Spitzbergen-Jan Mayen area of the Arctic Ocean and two-or-three missions in the Baltic. The Air Staff planned for the B-29 Ferret to be equipped with the new

⁶⁷ A series of memoranda represent the first declassified that document State - Air Force cooperation. It may have originated earlier, but I have found no unclassified archival evidence. Memorandum for Record, Major Langbehn, 24 July 1947, Subject: To prepare cable to Hq, USAFE requesting information as to Photo material and whether photos were being taken of Targets of Opportunity during Ferret operations, TS Control number: 2-221, File: 2-200 to 2-299 Jul 47-Aug 47, Box 39, Entry 214, RG 341, NA.

⁶⁸ MFR, Problem: To advise COMGENUSAFAE, Weisbaden regarding further flights in the Baltic Area, n.d., TS Control number: 2-237, File: 2-200 to 2-299 Jul 47-Aug 47, Box 39, Entry 214, RG 341, NA.

⁶⁹ Ibid.

⁷⁰ Ibid.

AN/APR-9 search receivers to enable the aircraft to intercept a wider range of radar, navigational aid, and guided-missile signals. Because of earlier discussions, the Ferret collected visual, photo, and radar photography as a secondary mission.⁷¹ In addition, planners hoped to slip the Ferret in a formation of B-29s scheduled to take part in a World War II victory parade in Czechoslovakia, but the Czech government withdrew the invitation.⁷²

According to the crew of the "Sitting Duck," flights along the Berlin air corridor proved the most eventful during the Ferret's deployment. On September 12, 1947, the ELINT B-29 flew from its base in Giebelstadt, Germany to Frankfurt and then along the southern air corridor to Berlin. Without landing, the plane entered the northern corridor and flew to Hamburg. At this point, the aircraft reversed course and retraced its original route. At one stage of the flight, the crew encountered Soviet fighters. Captain Robert R. Perry described the scene:

... about halfway up the south corridor, Tanner [the pilot] calls on the intercom and says, "Hey, we've got Yaks on both sides!" ... "Nobody has fired yet, so let's just keep on the way we are going." We didn't have any guns, ... and they could see it. I just didn't want to make any sudden moves and get them excited. I said, "If we make a sudden move, it's going to trigger something. Just let those guys stay behind and don't tell them anything." [Two armed B-29s flew a few miles behind. The original plan called for the Ferret to tuck between the armed aircraft for protection.] The Yaks flew with us for, ... about 10 minutes and then Tanner says they dropped off.⁷³

At the completion of the B-29's deployment, the crew returned to the United States and formed the nucleus for SAC's first permanent electronic reconnaissance organization. The new 324th RCM Squadron consisted

⁷¹ Letter, E. E. Partridge, Major General, USA, Assistant Chief of Air Staff-3 to AC/AS-5, AC/AS-2 In Turn, Subject: Northern European Ferret Flights, 20 Aug 1947, TS Control number: 2-311, File number: 2-300 to 2-399 Aug 47- Sep 47, Box 39, Entry 214, RG 341, NA.

⁷² Wack, AOC 11, p. 14.

⁷³ Voltaggio, "Out in the Cold . . . , " p. 15, File: Voltaggio, AOC.

originally of the ELINT B-29 and an old B-17, but by the summer of 1948, the unit grew to six RB-29 Ferrets. Based at McGuire AFB, New Jersey, the 324th provided crews for sorties flown from Mildenhall, England; Frankfurt, Germany; Yokota, Japan; and Ladd AFB, Alaska. Although the unit suffered greater than usual "teething" problems, the establishment of the 324th RCM squadron represented an attempt by SAC leadership to address existing intelligence gaps.⁷⁴ Nevertheless, even though the expansion of Ferret efforts in 1947 provided valuable information on Soviet radar defenses, the United States Air Force still lacked a means of obtaining the strategic photographic intelligence needed for target analysis.

The problem of creating target folders emerged as the leading operational dilemma for strategic bombardment planning. In a sense, strategic target folders represented the bridge from abstract theories of air war to operational reality. The Air Force assigned overall responsibility for target folders to the Strategic Vulnerability Branch of the Air Staff. This organization divided the task into three phases:

1. The compilation of a world bombing encyclopedia that located potential targets.
2. The analysis of the data compiled in the bomb encyclopedia to include the plant's name, geographic coordinates, function, output, and transportation routes.⁷⁵
3. The creation of operational target folders for bomber crews that contained the name, identity, location, and profile of the specific objective. In addition, the Strategic Air Command was tasked to provide

⁷⁴ Joseph H. Wack described the unit as extremely unmilitary in appearance and attitude. In addition, as the Air Force eliminated pilots, a number were made Ravens. Many of these men proved bitter and unmotivated for electronic warfare. Wack, AOC 11, pp. 15-16.

⁷⁵ As early as 1947, the Air Force used IBM punch cards and first-generation computers for this task. Dr. James Lowe, "The Intelligence Basis of Selection of Strategic Target Systems," Air War College Lecture, 13 November 1947, Maxwell Air Force Base, Montgomery, AL, pp. 5-7, File number: K239.716247-50, 13 Nov 47, USAFHRC.

the necessary maps and charts to reach the target.⁷⁶

Thus, the Strategic Vulnerability Branch was tasked to provide the analysis and target selection for a precision bombing campaign.

World War II experience dramatized the importance of target selection.

The European summary report of the United States Strategic Bombing Survey noted that Germany feared attacks on basic industries (oil, chemicals, or steel) more than attacks on their armament industry or cities.⁷⁷ The Survey also stressed the need for strategic intelligence particularly during the early phases of the war.⁷⁸ In fact the Air Staff created the Strategic Vulnerability Branch expressly to avoid the pitfalls of World War II intelligence flaws. The USAF hoped to avoid the European Theater's reliance on a foreign power for target intelligence and the two-to-three year delay in the Pacific for acquiring sufficient information.⁷⁹

Unfortunately, despite its awareness of the importance of target information, the United States lacked operational target folders in 1947. The Strategic Vulnerability Branch gathered sufficient information for target sheets for between eight and ten thousand particular installations in the USSR; however, the Strategic Air Command lacked the resources to produce the necessary maps and charts.⁸⁰ Consequently, SAC bomber and reconnaissance crews lacked the target folders needed to wage a precision bombing campaign.

⁷⁶ Ibid.

⁷⁷ The United States Strategic Bombing Survey Summary Report, (European War), September 30, 1945, p. 16, In *The United States Strategic Bombing Survey*, ed. David MacIsaac, vol. 1 (New York: Garland Press, 1976).

⁷⁸ Ibid., p. 17

⁷⁹ Lowe, "The Intelligence Basis of Selection of Strategic Target Systems," p. 1.

⁸⁰ Ibid., p. 6.

Faced with a shortage of strategic intelligence, the Air Force sought alternate sources of information. In 1947 and 1948, the Air Force explored intelligence arrangements with German, Swedish, and Turkish military intelligence organizations. The greatest effort involved projects to exploit World War II German intelligence efforts. An Air Staff memorandum listed the sources of information available:

- a. Some specific information on various Russian oil refineries.
- b. The complete operational plan of the German operation known as "[E]isenhammer" to include maps and annotated photographs.
- c. Certain military geographical information on Russia (Published by OKW).
- d. Exact information regarding the bridge near KIEV and the highway between LEMBERG and VORONESCH.
- e. Meteorological information on Russia.
- f. Target photographs of various Russian airfields.
- g. Some aerial photos of certain Caucasian ports.
- h. Aerial photographs of the Crimea.
- i. Certain photographs covering Central and South Russia.⁸¹

In addition, the Air Force hired remnants of the German military intelligence organization established by General Reinhard Gehlen during World War II. The former *Abwehr* system operated a network of agents in the Soviet Union and satellite countries.⁸² Although Germany's numerous intelligence failures on the Eastern front casts doubt on the quality of information provided, the US Air Force had few other sources. According to General Curtis E. LeMay, "Certainly what they [the German spy network] provided was far better than what we could have gathered on our own, because at this time we were really babes-in-the-

⁸¹ Memorandum, unsigned, Subject: "Project for Procuring Special Information Pertaining to USSR," 29 September 1947, TS Control number: 2-450, File number: 2-400 to 2-499 Sep 47-Oct 47, Box 39, Entry 214, RG 341, NA.

⁸² Gehlen's network also collaborated with the US Army's G-2 (Intelligence). In 1949, Gehlen entered a contract with the Central Intelligence Agency. Rhodri Jeffreys-Jones, *The CIA and American Democracy* (New Haven, Conn.: Yale University Press, 1989), p. 104.

woods as far as intelligence was concerned.⁸³ The Air Force also interrogated German scientists in an effort to learn more about the V-2 missile and other technological projects. In Project ABSTRACT, Lieutenant Colonel Malcolm D. Seashore interviewed scientists to ascertain the location of V-2 documents buried in the Bad Sachsa and Harz mountains. With Peenemunde in Russian hands, not only did the project aim to acquire documents and equipment for the United States, but to deny such information from the Soviets.⁸⁴

In another unusual effort to gather target information, the United States Air Force arranged a highly secret reconnaissance agreement with the Swedish General Staff. In exchange for US Air Force cameras and photographic supplies, the Swedish General Staff of Defense agreed to provide photographs from Swedish aerial and naval reconnaissance.⁸⁵ The USAF supplied Sweden with four K-22 aerial cameras with 24- and 40-inch lenses and ample photographic supplies and the US Navy provided two type F-56 cameras for Swedish naval craft. In return, the Swedes furnished two prints and one contact film base positive for each negative produced with the equipment.⁸⁶ Due to the political sensitivity surrounding this act, the Air Force sought absolute secrecy. Air Intelligence even suggested removing the "loaned" cameras from Air Force

⁸³ In 1948, Lieutenant General LeMay commanded the United States Air Forces in Europe. Oral History, General Curtis E. LeMay interviewed by Mr. John T. Bohn, 9 March 1971, March AFB, CA, United States Air Force Oral History Program, File number: K239.0512-736, 9 Mar 71, USAFHRC.

⁸⁴ Staff Summary Sheet, From AC/AS-2 to Deputy Chief of Air Staff for Research and Development, Subject: Project Abstract, 29 July 1947, TS Control number: 2-224, File: 2-200 to 2-299 Jul 47- Aug 47, Box 39, Entry 214, RG 341, NA.

⁸⁵ Letter, George C. McDonald, Major General, USAF, Director of Intelligence to Military Attaché, U. S. Embassy, Stockholm, Sweden, Subject: Loan of Aerial Cameras, 20 Nov 47, TS Control number: 2-377A, File number: 2-300 to 2-399 Aug 47- Sep 47, Box 39, Entry 214, RG 341, NA.

⁸⁶ Ibid.

supply records.⁶⁷

In a further search for additional strategic intelligence, the Air Force explored electronic reconnaissance along the border of the USSR and Turkey. The Air Communications Group of the Air Staff proposed giving the Turkish Air Force a C-47 transport modified for electronic intelligence; however, the Strategic Air Command strongly disagreed. SAC worried that US ELINT capabilities might be compromised if American electronic reconnaissance equipment were operated by a foreign air force. Instead, SAC suggested the addition of an Air Force Ferret aircraft to a detachment of the 311th Reconnaissance Wing already scheduled for a photomapping project over Turkey. While waiting approval of the Turkish government, the Air Staff apparently tabled the projects.⁶⁸

Despite wide-ranging efforts, the dilemma posed by inadequate strategic intelligence influenced strategic war planning. On February 11, 1948, the Joint Staff Planning Group completed Joint Emergency War Plan BROILER. In some respects BROILER resembled the PINCHER plans: the United States assumed an accidental outbreak of war, overwhelming Soviet superiority in land forces, a Russian capability to overrun Europe with little resistance, the need to safeguard North America, the United Kingdom, and a few key air bases, and an American strategic air campaign as the principal response to Soviet aggression. Nevertheless, while PINCHER reflected the Spaatz Board

⁶⁷ Adding to the desire for security, the staff officers involved in the project worried that they might be held "remuneratively liable" for any lost equipment. Memorandum for Record, Subject: To request that Director of Supply and Services, DCS/M direct Base Accountable Officer, Bolling Air Force Base, issue property for urgent use, n. d. [4 Feb 1948], TS Control number: 2-963, File number: 2-900 to 2-999 Feb 48, Box 40, Entry 214, RG 341, NA.

⁶⁸ Letter, George C. McDonald, Major General, USAF, Director of Intelligence, Office of Deputy Chief of Staff, Operations to Air Communications Group, DCS/O, Subject: Electronic Reconnaissance Project, 24 Feb 1948; Memorandum for Record, Problem: To comment on a proposal by Air Communications Group for Electronic Reconnaissance of USSR from Turkey, n. d., TS Control Number: 2-951, File 2-900 to 2-999 Feb 48, Box 40, Entry 214, RG 341, NA.

assessment, BROILER relied heavily on atomic bombs. In other words, instead of a strategic campaign featuring conventional bombardment augmented by a few atomic bombs, BROILER reversed the equation. The atomic bombing of "the vital centers of Soviet war-making capacity" formed the heart of BROILER.⁸⁹

The political assumptions of BROILER paralleled the Truman Administration's containment doctrine. According to the JCS planners, the Soviet political objectives sought a Soviet-dominated "Communist World" as a maximum aim and a barrier of Communist-dominated countries on Soviet borders as an immediate goal.⁹⁰ As a result, the national objectives of the United States consisted of the following:

- a. To destroy the war-making capacity of the U.S.S.R. to the extent and in such manner as to permit the accomplishment of b, c, and d below.
- b. To compel the withdrawal of Soviet military and political forces from areas under their control or domination at least to within Soviet 1939 boundaries.
- c. To create conditions within the U.S.S.R. which will insure abandonment of Soviet political and military aggression.
- d. To establish conditions conducive to future international stability.⁹¹

To achieve these goals, the Joint Chiefs advocated a strategic concept based on Douhet's view of air power. The United States plan sought "To destroy the will of the U.S.S.R." by launching an air offensive designed "to exploit the destructive and psychological power of atomic weapons against vital elements of the Soviet warmaking capacity. . ." ⁹²

War plan BROILER's outline for the strategic air campaign reflected a subtle, but important, doctrinal shift. At first glance, BROILER's key target

⁸⁹ JSPG 496/4, BROILER, 11 February 1948, p. 2, in *America's Plans for War Against the Soviet Union, 1945-1950*, edited by Steven T. Ross and David Alan Rosenberg (New York: Garland Publishing, 1990), Vol. 6: *Plan Frolic and American Resources*.

⁹⁰ JSPG 496/4, 11 Feb 48, Annex "A" to Appendix, p. 22.

⁹¹ JSPG 496/4, 11 Feb 48, Appendix, p. 6.

⁹² JSPG 496/4, 11 Feb 49, Appendix, p. 7.

systems resemble the precision bombing campaign of World War II:

- a. Key government and control facilities.
- b. Urban industrial areas.
- c. Petroleum industry.
- d. Submarine bases, construction and repair facilities.
- e. Transportation system.
- f. Aircraft industry.
- g. Coke, iron and steel industry.
- h. The electric power system.⁹³

Moreover, the planners claimed the campaign would attack the following percentage of Soviet industry:

Airframes	98.8%	Autos & Trucks	88%
Aero Engines	100%	Tanks & Self-propelled guns	94%
Armament	65%	Crude Oil Refineries	63.7%
Coke	67.5%	Steel	65%
Zinc	44%	Aviation Gasoline Refineries	77.8%
Submarine Construction Facilities	89% ⁹⁴	Total Shipbuilding Facilities	45%

Although BROILER contained the language and industrial emphasis of previous precision bombardment doctrine, the plans assumed the destruction of urban areas as inseparable from the destruction of the industry itself. In other words, whereas precision bombing doctrine targeted a specific industry within a city, BROILER targeted a city to destroy a specific industry. Because of American military weakness and a lack of target information, the Air Force abandoned the precision bombing doctrine formed by the Air Corps Tactical School and advocated during World War II. Frustrated by existing conditions, the Air Force reverted to area bombing.

With reduced emphasis on conventional bombing, BROILER reflected revised thought about the strategic implications of the atomic bomb. Three assumptions provided the foundation for American war planning at this time:

⁹³JSPG 496/4, 11 Feb 48, Annex "C" to Appendix, p. 178.

⁹⁴JSPG 496/4, 11 Feb 48, Annex "C" to Appendix, p. 176.

- a. The United States is the only country now possessing atomic bombs.
- b. The United States will possess reasonable stockpiles of atomic bombs at the outset of an emergency, will be in production of atomic bombs during hostilities, and will have the capability of continued and increased production of atomic bombs during hostilities.
- c. No agreement exists for the international control of atomic weapons nor will such agreement be reached during this period.⁹⁵

The Joint Planners realized that the Soviet Union would exert every effort to develop and produce atomic weapons, but America's atomic monopoly served as the cornerstone of its defense strategy.⁹⁶ Although the United States believed the bomb to be a tremendous strategic advantage, JCS planners did not know the extent of the atomic bomb's psychological impact. Advocates asserted that "the combined physical destruction and psychological effect would be so great as to cause the Soviets to capitulate and accept Allied terms of surrender."⁹⁷ On the other hand, BROILER contained provisions for the long-term conventional bombing of thirty-nine petroleum industry targets and thirty-six submarine bases.⁹⁸ Regardless of the war's duration, the early effectiveness of the strategic air campaign determined the success of BROILER. The United States based its strategy upon the atomic bomb forcing immediate Soviet surrender or providing time for mobilization.

Although BROILER's reliance on atomic area bombing reduced the need for precise target information, the war plan still required effective aerial reconnaissance for success. Even though an area bombing campaign needed strategic photographic intelligence only to the extent of providing routes to cities and a general layout of "urban industrial areas," the bombers still required

⁹⁵ JSPG 496/4, 11 Feb 48, Annex "A" to Appendix, p. 14.

⁹⁶ Ibid.

⁹⁷ JSPG 496/4, 11 Feb 48, Annex "A" to Appendix, p. 17.

⁹⁸ JSPG 496/4, 11 Feb 48, Tab "A" to Annex "C," p. 192.

accurate intelligence for penetration of Soviet air defenses. Unlike the latter stages of the Combined Bomber Offensive, the Allied bombers of war plan BROILER faced overwhelming numbers of enemy fighters. In October 1943, the *Luftwaffe* massed roughly 1,000 fighters over Germany, but Soviet air defenses featured 6,000 fighters, including 800 jets.⁹⁹ The Joint Staff estimated that an attacking force might be intercepted three times: once passing over the satellite boundary, once at the target area, and again on withdrawal over the boundary. Furthermore, BROILER warned of Soviet conventional fighters capable of 35,000-foot altitudes and speeds up to 366 knots and jet fighters capable of 40,000-foot ceilings and effective speeds of 465 knots.¹⁰⁰ Despite these numbers, Soviet fighter performance mattered little if Soviet radar systems proved inadequate.

BROILER's estimate of Soviet radar defenses reflected the findings of Air Force electronic reconnaissance. According to the Joint Intelligence Group, the USSR possessed "adequate" early warning radar for "sufficient" coverage of the entire border. Nevertheless, in the immediate future, available Soviet GCI equipment only permitted the defense of six critical areas with a diameter of 100 miles each.¹⁰¹ Obviously, SAC bombers sought additional information to avoid strong air defense zones.

⁹⁹ For German fighter strength see Williamson Murray, *Luftwaffe* (Baltimore: Nautical & Aviation Publishing Co., 1985), p. 214. The Soviet figures represent the Joint Intelligence Committee estimate for total Soviet fighters. JSPG 496/4, 11 Feb 48, p. 3; Annex "A" to Appendix, p. 27; Tab "A" to Annex "A," p. 71.

¹⁰⁰ The Joint Intelligence Committee estimated the Soviet Air Defense Fighter Force (PVO) to have a strength of 1,600 fighters deployed in the following areas:

Far East	200
Black Sea	500
Murmansk-Archangel	300
USSR interior	700

JSPG 496/4, 11 Feb 48, Annex "A" to Appendix, pp. 26-27.

¹⁰¹ JSPG 496/4, 11 Feb 48, Annex "A" to Appendix, pp. 27-28.

Like the previous PINCHER plans, Joint Emergency War Plan BROILER reflected desired, rather than actual, US capabilities. For instance, BROILER outlined the following schedule for the required strategic air forces:

<u>Totals</u>	<u>D+1</u>	<u>D+2</u>	<u>D+3</u>	<u>D+6</u>
Medium Bomber Groups (B-29/50)	6	15	20	20
Very Long Range Recon Groups	5-1/3	7	8	8
Escort Fighter Groups	6	7	8	10
Defensive Fighter Groups (Day)	6	9	11	11
Defensive Fighter Groups (All Weather)	1	2-1/3	2-1/3	2-1/3
Aircraft Control & Warning Squadrons	12	12	12	12

(Group strength D to D+3 is 3 squadrons. Augmentation to 4 squadron strength will be effected during the period D+3 to D+12. Some units will be equipped with heavier type aircraft, as they become available, during the period D+3 to D+12.)¹⁰²

Furthermore, the air campaign called for 10,184 air sorties on primary targets, including 2,700 reconnaissance missions.¹⁰³

Closer analysis of war plan BROILER reveals a number of flawed operational assumptions. In considering the mobilization of air forces, the plan overlooks the difficulty of assembling, equipping, and training crews. The idea of recalling World War II veterans, retraining them, and sending them into combat within a month is pure fantasy. The plan's schedule takes no account of where aircraft could be procured. Regardless of whether aircraft came from factories or represented refurbished World War II equipment, it would take longer than a month to ready them for flight. Ironically, war plan BROILER's unquestioned reliance on the atomic bomb represented a major problem. JCS planners did not understand the limits of the atomic bomb stockpile, the operational limits to the bomb's deployment, or the actual capabilities of atomic weapons since the planners were denied clearance to these details by the

¹⁰² Ibid., Annex "B" to Appendix, p. 126.

¹⁰³ JSPG 496/4, 11 Feb 48, Tab "A" to Annex "C," p. 192.

Atomic Energy Commission.¹⁰⁴ In other words, the war planners lacked access to the types of information required by the emergency war plans. In a sense, the Joint Emergency War Plans, represented by PINCHER and BROILER, operated in an information vacuum with little knowledge of actual Soviet or American capability.

The Berlin crisis of 1948 awakened American policy makers to the danger of inadequate strategic intelligence. Upset with the Allied opposition to a new regulation that required inspection of US personnel entering the Russian zone, the Soviets closed highway, rail, and river access to Berlin. The Soviets denied access from April 1 to July 1 under the guise of "technical difficulties."¹⁰⁵ By July, the rationale for blockade shifted to protecting the Soviet zone from the currency reform sponsored by the western powers.¹⁰⁶ Despite the immediate reasons, President Truman viewed the Berlin Crisis as significant in greater terms. He believed the blockade represented a Soviet test of western resolve and patience. At issue was the western presence in Berlin and the viability of the Marshall Plan. As Truman perceived the crisis, the Soviets tried to convince the people of Europe that the United States would only support them only in economic matters and would back away from any military risk. The question remained: How could the United States remain in Berlin without risking all-out

¹⁰⁴ Memorandum for Lt. Gen. Lewis H. Brereton, Chairman, Military Liaison Committee, Atomic Energy Commission from George C. McDonald, Major General, U.S. Army, Assistant Chief of Air Staff-2, Subject: Denial of Clearances by the Atomic Energy Commission of AAF Key Personnel, 23 July 1947, TS Control number: 2-195, File number: 2-100 to 2-199 Jun 47 - Jul 47, Box 39, Entry 214, RG 341, NA.

¹⁰⁵ On March 31, 1948, General Dratvin, the deputy military governor of the Soviet Union, announced that the Soviets would check all US personnel passing through their zone for identification and inspect all freight shipments. The Allies objected since they had received assurance of free access to Berlin at the end of the war. Harry S. Truman, *Memoirs by Harry S. Truman* (Garden City, N. Y.: Doubleday & Co., 1956) Vol. 2: *Years of Trial and Hope*, p. 122.

¹⁰⁶ On June 18, 1948, France, Britain, and the United States announced that the three western powers would establish a new currency for the western zones in order to integrate western Germany into the European economy. *Ibid.*

war?¹⁰⁷ Although the Berlin Airlift provided a means of facing the challenge without hostilities, President Truman appreciated the gravity of the situation:

Our position in Berlin was precarious. If we wished to remain there, we would have to make a show of strength. But there was always the risk that the Russian reaction might lead to war. We had to face the possibility that Russia might deliberately choose to make Berlin the pretext for war. but a more immediate danger was the risk that a trigger-happy Russian pilot or hotheaded Communist tank commander might create an incident that could ignite the powder keg.¹⁰⁸

Thus, the Berlin Crisis resembled the political miscalculation which launched the war as envisioned by the Joint Emergency War Plans. Rather than planning exercises based on hypothetical scenarios, the Berlin Crisis illustrated the distinct possibility of war with the Soviet Union.

On a broad scale, the Berlin Airlift demonstrated the patience, resolve, and political acumen of the West. Furthermore, the aerial convoy represented an unprecedented achievement by American and British air power.¹⁰⁹ Less well publicized, the Air Force mobilized units of the Strategic Air Command to signal US military resolve. Following a Presidential cabinet meeting on June 25, 1948 and Presidential authorization of a maximum effort airlift the next day, Headquarters, USAF ordered a SAC alert and the transfer of the 301st Bomb Group to Germany. Adding to the 301st's B-29s, the 307th and 28th Bomb Groups assumed alert postures in England.¹¹⁰ Significantly, none of the units

¹⁰⁷ Truman, *Years of Trial and Hope*, p. 123 & p. 125.

¹⁰⁸ Ibid., p. 124.

¹⁰⁹ For details of airlift operations see Roger D. Launius, "The Berlin Airlift: Constructive Air Power," *Airpower History* 36 (Spring 1989): 8-22.

¹¹⁰ The authorized strength of a bomb group numbered seventy-five B-29s. Most units possessed fewer aircraft, but the SAC deployment represented a sizable percentage of the Air Force's bombardment force. Headquarters Strategic Air Command Routing and Record Sheet (hereafter abbreviated Hq SAC R&R), From Raymond B. Holden, Major, USAF (for J. B. Montgomery, Brig General, USAF, Director of Operations) to Historical Section, 18 Aug 1949, in *History Strategic Air Command 1948*, Vol. 4: *Supporting Documents*, File number: 416.01, v. 4, 1948, USAFHRC.

involved were nuclear capable. In addition, SAC ordered the 311th Air Division to send six reconnaissance aircraft to Europe.¹¹¹ As shown in plan BROILER, the photographic reconnaissance aircraft would play an important role in the event of hostilities.

Faced by the prospect of war in the immediate future, the United States Air Forces in Europe authorized the B-17 Ferret aircraft of the 7499th Squadron to conduct electronic reconnaissance missions along the Berlin air corridor. To avoid Soviet suspicions over the distinctive appearance of the B-17 Ferret, the ELINT aircraft flew only at night. Slipped into the stream of C-47s and C-54s, the Ferret never landed in Berlin. Instead, the pilot would radio the tower and report "landing gear trouble."¹¹² Although the Ferret only discovered a few additional Soviet RUS-2 "Dumbo" radar sites, the action joined other preparations for hostilities.

Combining with the tension of the Berlin Crisis, reports of Soviet activities in Alaska raised additional worries over potential Soviet attack. A memorandum for the Secretary of the Air Force from General Spaatz listed Soviet jamming of reconnaissance flights, Soviet aerial reconnaissance of the Arctic Ocean and Greenland, and construction of airfields on the Chukotski Peninsula as examples of alarming activities.¹¹³ Considering the impact of America's intelligence failure prior to Pearl Harbor, the prospect of airfields capable of launching long-range bombers prompted US efforts to reconnoiter the areas of Siberia adjacent to Alaska. Secretary of the Air Force W. Stuart

¹¹¹ *History Strategic Air Command 1948*, Vol. 1, p. 245, USAFHRC.

¹¹² Haugen, AOC 25, p. 8.

¹¹³ Directly across the Bering Strait from Alaska, Cape Chukotsk was usually addressed as the "Chukotski Peninsula" by the documents. For the sake of simplicity, I have adopted this transliteration. Memorandum for the Secretary of the Air Force from Carl Spaatz, Chief of Staff, United States Air Force, Subject: Some Reports of Soviet Activities in Alaska and Adjacent Thereto, 25 March 1948, TS Control number: 2-1193, File number: 2-1100 to 2-1199, Box 40, Entry 214, RG 341, NA.

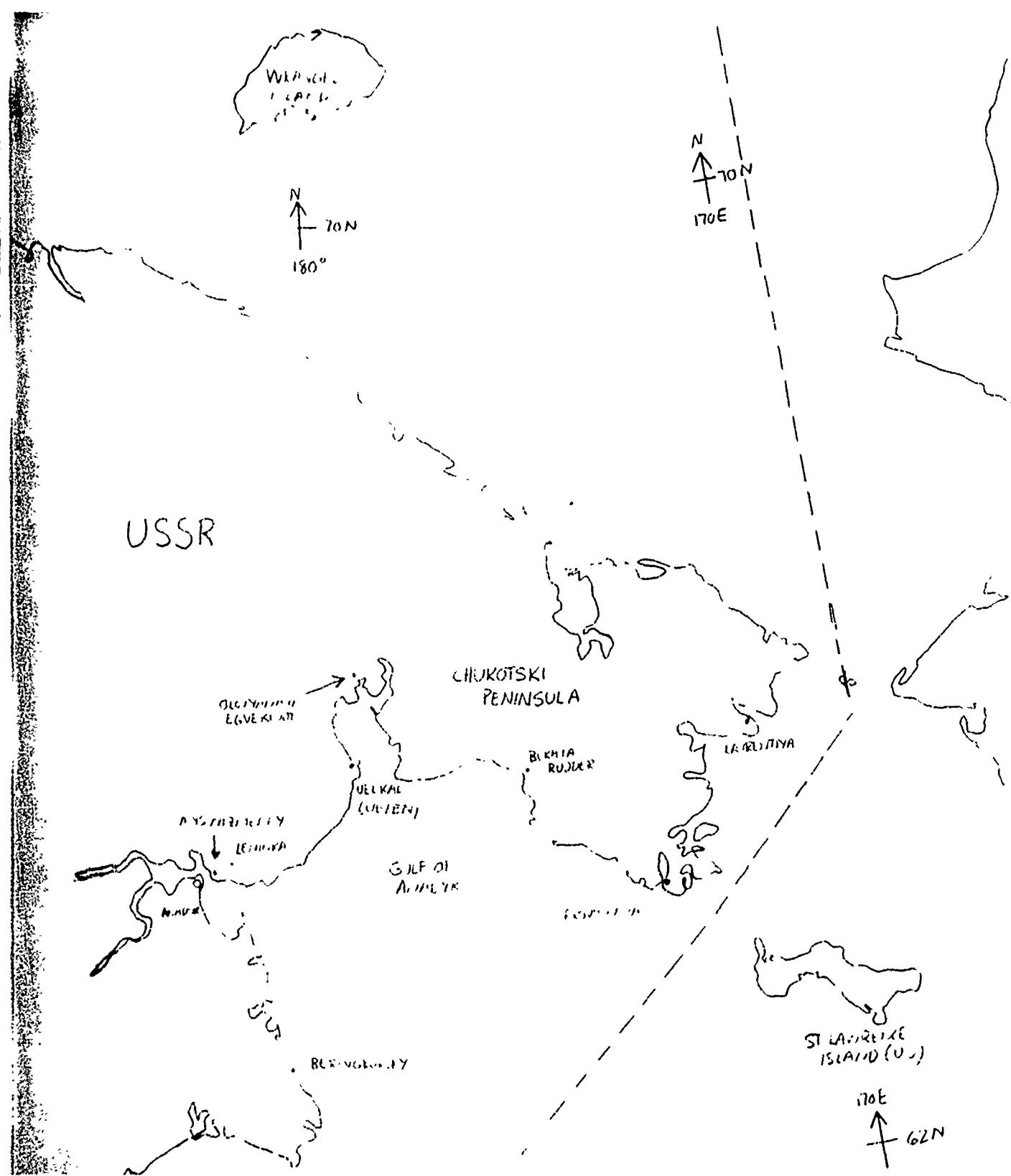
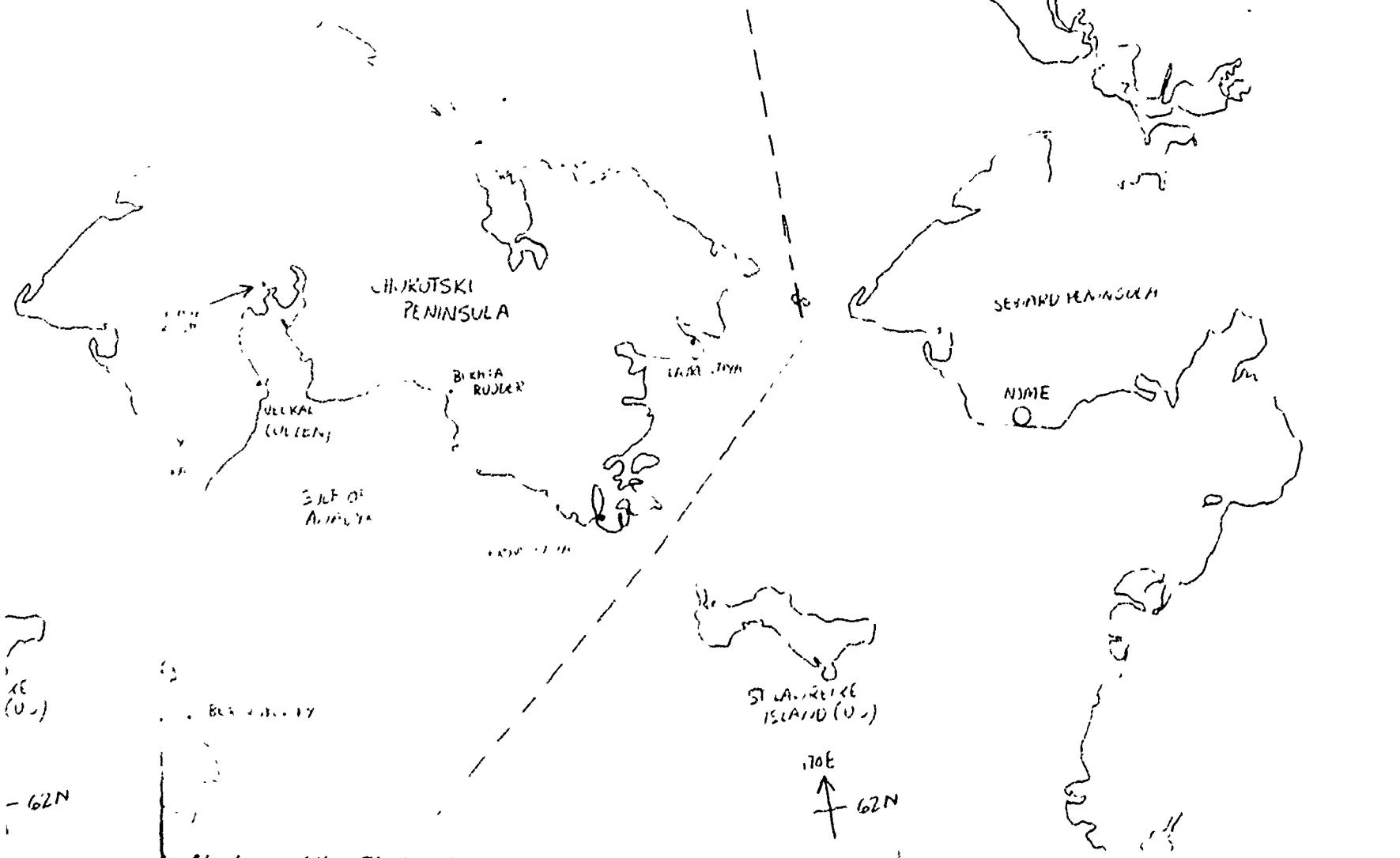
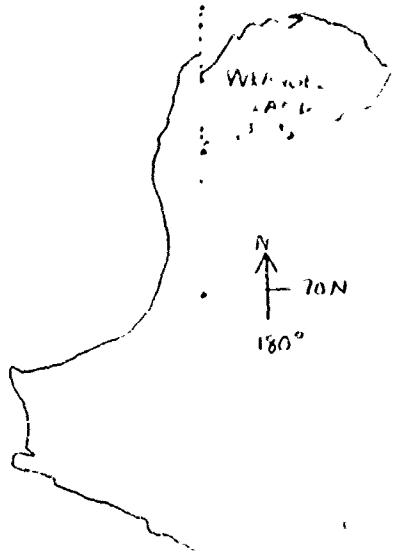


FIGURE 2: Alaska and the Chukotski Peninsula



Alaska and the Chukotski Peninsula

Symington pushed the program further when he asked General Spaatz why no pictures existed of Soviet airfields on the Chukotski Peninsula.¹¹⁴

The effort to photograph the Soviet bases on the Chukotski Peninsula illustrated the technological and political constraints present for strategic photographic intelligence. On one hand, vertical air photographs of Soviet airfields risked the loss of the plane and a grave international crisis. Yet, existing aerial cameras proved inadequate for long-range oblique photography.¹¹⁵ To solve the dilemma, the Director of Air Force Intelligence proposed the reduction of the State Department's restriction on aerial operations from twelve miles to three miles and to use 40-inch focal length cameras. When the Air Staff finally agreed to send this proposal to the Department of State for approval in May 1948, the Berlin Crisis had changed the political climate. Not seeking to further inflame international tensions, General Lauris Norstad preempted the request for reduced restrictions. By May 13, 1948, the Department of State increased the restriction to forty miles to avoid provoking the USSR.¹¹⁶ Although the actions avoided igniting the volatile political situation, the increased buffer zone left unsolved the operational problem of how to photograph the Chukotski Peninsula.

¹¹⁴ Memorandum for General Spaatz from W. Stuart Symington, 5 April 1948, TS Control number: 2-1378, File number: 2-1300 to 2-1399 (1948), Box 41, Entry 214, RG 341, NA.

¹¹⁵ The existing photographs originated from short focal length coverage made as a secondary function of Mission 7 M 263A, the Project 23 flight that allegedly violated the Soviet frontier. Unfortunately, the photographs produced no information of significant intelligence value. R & R, Air Intelligence Requirements Division (AFOIR-RC), Subject: Photographic Coverage -- Chukotski Peninsula, n. d., TS Control number 2-1378, File number: 2-1300 to 2-1399 (1948), Box 41, Entry 214, RG 341, NA.

¹¹⁶ R & R, Director of Intelligence to Director of Plans and Operations, Subject: Photographic Coverage -- Chukotski Peninsula Airfields, 7 May 1948, TS Control number: 2-1560, File number: 2-1500 to 2-1599, Box 41; MFR, "To brief background facts on establishment of 40-mile limit for reconnaissance flights in Pacific Area, TS Control number: 2-3015, File number: 2-3003 to 2-3099, Box 42, Entry 214, RG 341, NA.

The resolution of the Chukotski airfield dilemma demanded technological innovation. Ironically, Colonel George W. Goddard, the man who pioneered aerial photography in the interwar period, provided the breakthrough in the form of 48-, 60-, and 100-inch focal length cameras at the Air Material Command.¹¹⁷ In addition, by October 1948, lessened tensions caused by the success of the Berlin Airlift permitted the reduction of the reconnaissance restricted area to twenty miles from the Soviet shore.¹¹⁸ Therefore, during October and November, an Air Force F-13, equipped with an experimental 100-inch camera mounted for oblique photography, completed needed coverage of the Chukotski Peninsula. Further analysis of the photos dispelled fears of substantial bases at the sites capable of long-range missions upon the United States.¹¹⁹

Complementing the Chukotski photography campaign, the Director of Air Force Intelligence revamped the Alaskan Air Command's Radio Countermeasures (RCM) effort in a July 26, 1948 letter to the Commanding General, AAC. Rescinding previous electronic reconnaissance directives, the letter established uniform policy, operating procedures, search areas, and defined ELINT objectives. Headquarters Air Force directed the AAC to concentrate its efforts on discovering radar chains and operating schedules and to determine which signals, if any, belonged to IFF (Identification Friend or Foe)

¹¹⁷ Letter, Walter R. Agee, Brigadier General, USAF, Chief, Air Intel. Req. Div., Directorate of Intelligence to Commander-in-Chief, Alaskan Command, 15 Dec 1948, TS Control number: 2-5676A, File number: 2-5600 to 2-5699, Box 43, Entry 214, RG 341, NA.

¹¹⁸ The existing documents fail to mention the exact date of the shift to a 20-mile buffer. Letter, H. M. Monroe, Colonel, GSC, Chief of Staff, Headquarters Alaskan Command to Chief of Staff, United States Air Force, Subject: Importance of Long-range Photography to Alaskan Theater, n. d., TS Control number: 2-5676A, File number: 2-5600 to 2-5699, Box 43, Entry 214, RG 341, NA.

¹¹⁹ Specifically, the flights photographed Soviet facilities located at Uelen, Lavrentiya, Mys Caplina, and Provideniya areas. MFR, Problem: To present recently established Photo Intelligence to supplement the information contained in the article "Chukotsky Peninsula" appearing in the March issue of the Air Intelligence Digest, n. d., TS Control number: 2-6725, File number: 2-6700 to 2-6799 (March 1949), Box 44, Entry 214, RG 341, NA.

systems.¹²⁰ The policy letter also established a ten-day deadline for complete mission reports to be forwarded to the Directorate of Intelligence. This action reflected the failure of previous Alaskan reporting to keep higher headquarters informed of current developments.¹²¹ Finally, the Director of Intelligence summarized world-wide Ferret accomplishments. In Europe, Ferrets established the location and characteristics of thirty-nine radar stations while FEAF and AAC Ferrets combined to identify eleven Soviet radar sites.¹²² In addition, General Cabell's letter urged special attention towards the identification of Soviet shipborne radar to prevent mistaking ships in port for land-based stations.¹²³ The net effect of the AAC policy letter resulted in standardized procedures and centralized control for the two RB-29 Ferret

¹²⁰ "Specific objectives of the electronics reconnaissance mission are as follows:

a. To search and report upon the following frequency spreads:

(1) 50 Mcs to 1500 Mcs.
 (2) 1800 Mcs to 2000 Mcs.
 (3) 2400 Mcs to 3100 Mcs. . . .

b. While intense search should be centered on the above spreads, systematic full range searches should not be ignored. . . . Letter, C. P. Cabell, Major General, USAF, Director of Intelligence, Office of Deputy Chief of Staff, Operations to Commanding General, Alaskan Air Command, Subject: RCM Ferret Program -- Alaskan Air Command, 26 Jul 1948, TS Control number: 2-3037, File: 2-3003 to 2-3099 Jul 1948, Box 42, Entry 214, RG 341, NA.

¹²¹ Ibid.; MFR in Memorandum for Secretary, Joint Intelligence Committee from C. P. Cabell, Major General, USAF, Acting Director of Intelligence, 12 Mar 1948, TS Control number: 2-1136, File number: 2-1100 to 2-1199 Mar 1948, Box 41, Entry 214, RG 341, NA.

¹²² AAC Ferret Results, 1948:

Location	Frequency (mcS)	PRF	Pulse Width (Microseconds)
1. Wrangel Island	45	570	3.0
2. Diomede Island	1100	1500	-
3. Vel'kal	148	-	1.25
4. Anadyr	148	-	1.25
5. Cape Kronotski	280	low	wide
6. Petropavlovsk	1445	-	1.0
7. S. of Petropavlovsk	2866	820	1.6
8. Cape Pernverts	1000	2750 & 540	1.2
9. Vladivostok	215	-	1.2
10. Wondan, Korea (sic)	1820	450	1.3
11. Dairen, Manchuria	58.2	200	1.8
	64	480	44.0

Letter, Cabell to CG, AAC, Subj.: RCM Ferret Program -- AAC, 26 Jul 48, Tab B.

¹²³ Letter, Cabell to CG, AAC, Subj: RCM Ferret Program -- AAC, 26 Jul 48.

aircraft dedicated to the Alaskan RCM program.¹²⁴

In sum, the establishment of a formal Alaskan RCM program represented the steady bureaucratic progress of strategic aerial reconnaissance. From Truman's declaration of containment in July 1947 to the Berlin Crisis of 1948, Air Force efforts to gather strategic intelligence advanced in direction, standardization, and centralization. Moreover, technological developments in the form of RB-29 Ferret aircraft and advanced 100-inch focal length cameras enhanced the collection effort. Nevertheless, the need for target intelligence and Soviet radar information increased dramatically as international events intensified fears of Soviet surprise attack. Aware of US weakness in conventional forces, American strategic planners emphasized the atomic bomb as both deterrent and primary war-fighting weapon. Furthermore, significant gaps in US strategic reconnaissance capabilities jeopardized strategic air doctrine based on precision bombing. As shown by Joint Emergency War Plan BROILER, American air doctrine reverted to area bombing concepts reminiscent of Giulio Douhet. Until strategic aerial reconnaissance crossed the technological barriers required for specific target intelligence, American war plans relied on an atomic bludgeon.

¹²⁴ On March 10, 1948, the AAC Ferret program was suspended until new aircraft could be procured. When two B-29s equipped for Ferret operations appeared, the program resumed on June 10, 1948. MFR, Problem: To provide the Alaskan Air Command with a directive to cover the electronic reconnaissance activities of the ferret aircraft under the control of that command, n. d., TS Control number: 2-3027, File number: 2-3003 to 2-3099 Jul 1948, Box 42, Entry 214, RG 341, NA.

CHAPTER IV
STRATEGIC BOMBING QUESTIONED:
INTELLIGENCE SHORTFALLS AND WAR PLANS, 1949-1950

We consider that strategic air warfare, as practiced in the past and as proposed for the future, is militarily unsound and of limited effect, is morally wrong, and is decidedly harmful to the stability of a postwar world.

Rear Admiral Ralph A. Ostie, USN¹

As Berlin tensions cooled, the Truman Administration returned to the fundamental dilemma of budgets and defense: how could the government defend the nation from the Soviet menace and yet not bankrupt the country? As military leaders urged greater spending on rearmament, President Truman worried that not only would additional spending fuel devastating inflation, but increased arms might provoke war. Consequently, the President insisted on a firm ceiling on military expenditures. The defense budget cap exacerbated disputes among the armed services over proper roles and missions. The apparent triumph of air power during World War II spurred the debate. Not only did the Air Force tout strategic air power as a war-winning weapon, but the Navy advanced naval air power as an instrument of power projection. Worried about Air Force claims to its role as the nation's first line of defense and the airmen's coveting of naval aviation, the Navy challenged the assumptions behind strategic air power. Specifically, in the "Revolt of the Admirals," Navy leaders

¹ U.S. Congress, House, Committee on Armed Services, *The National Defense Program -- Unification and Strategy*, 81st Congress, 1st Session, 1949, p. 183.

attacked Air Force capability and strategic bombardment doctrine. Although the Air Force and strategic air war emerged from the Congressional hearings relatively unscathed, the Navy's criticism of one aspect of strategic air warfare against the Soviet Union proved apt. By examining the USAF Reconnaissance Program of 1949, SAC collection capabilities, and Air Force assessments of Soviet defenses, the shortfalls of USAF strategic reconnaissance become clear. The intelligence assumptions used by JCS war planners for the strategic air attack in Joint Emergency War Plan OFFTACKLE appear speculative and unproven.

The rhetoric in the interservice dispute over roles and missions intensified with reduced budgets. The paring of the Fiscal Year (FY) 1950 budget estimates began in 1948. The bitter presidential election campaign and the perilous relations with the Soviet Union influenced the process. President Truman stressed his commitment to a sound economy and downplayed US-Soviet hostility. He remained committed to a budget ceiling of \$14.4 billion for military appropriations. With the realization that inadequate funds prevented balanced forces, the Army and Air Force challenged the Navy's requirements for aircraft carriers.²

To the Navy, aircraft carriers represented the future of naval warfare. The epic naval air battles against the Japanese demonstrated the vital importance of the airplane to sea power. Moreover, naval air power expanded the Navy's role in power projection. With the advent of atomic weapons, the Navy understood the importance of gaining an air-atomic capability. Additionally, the sea service was determined to preserve its traditional role as America's first line of defense. As a result, the Navy attacked the upstart Air Force following budget talks in

² Rearden, *The Formative Years 1947-1950*, pg. 343-344.

October 1948. Leading the charge, Admiral Louis E. Denfeld, Chief of Naval Operations, attacked the competence of the junior service:

[The] unpleasant fact remains that the Navy has honest and sincere misgivings as to the ability of the Air Force successfully to deliver the [atomic] weapon by means of unescorted missions flown by present-day bombers, deep into enemy territory in the face of strong Soviet air defenses, and to drop it on targets whose locations are not accurately known.³

On the other hand, the Air Force viewed Navy criticism as a ploy to create a rival strategic air force. With the struggle for its independence fresh, Air Force leaders refuted the Navy charges and instead questioned the rationale behind the Navy's projected new "supercarrier" -- the 65,000-ton *U.S.S. United States*. Intended to operate aircraft weighing up to 100,000 pounds, the new carrier provided proof of the Navy's designs on strategic air warfare. To airmen, the Navy's carrier emphasis seemed misdirected; after all, the Soviets possessed a small surface fleet and threatened sea lanes primarily through submarines. According to Major General Hugh J. Knerr, "To maintain a five-ocean navy to fight a no-ocean opponent . . . is a foolish waste of time, men and resources."⁴

Despite conferences at Key West and Newport in 1948, the interservice dispute over roles and missions continued unabated.⁵ In October 1948,

³ Quoted in Rearden, *The Formative Years 1947-1950*, p. 344.

⁴ *Ibid.*, pp. 389-390.

⁵ The Key West Agreement of April 21, 1948 assigned primary and secondary missions to each service. "In general terms, the division of service responsibilities remained the same, with the Navy assigned primacy in combat operations at sea; the Army assigned land combat and responsibility for providing antiaircraft artillery for air defense; the Marine Corps assigned amphibious warfare; and the Air Force assigned strategic air warfare, defense of the United States against air attack, and air and logistic support of ground units." In addition, the Newport Agreement of August 21, 1948 refined the Key West missions. The Air Force received control of the Armed Forces Special Weapons Project which handled and assembled atomic weapons, but the Air Force could not deny the Navy access to atomic bombs or exclude the Navy from strategic operations planning. In addition, the Newport Agreement helped establish the Weapons Systems Evaluation Group. Richard I. Wolf, *The United States Air Force Basic Documents on Roles and Missions*. Air Staff Historical Study (Washington, D. C.: Office of Air Force History, 1987), pp. 151-169 & pp. 179-185; Rearden, *The Formative Years*, pp. 393-402.

Secretary of Defense James V. Forrestal attempted to resolve the impasse over strategic bombing by asking the Joint Chiefs of Staff to address two questions:

1. What were the chances that U.S. strategic aircraft, operating in accordance with current war plans, could successfully deliver atomic bombs on their targets in the face of Soviet air defenses?
2. What military and psychological effects would successful delivery have on the Soviet war effort?⁶

Eventually, the answers to these questions appeared in two top secret reports.

The May 1949 Harmon Report examined the impact of strategic bombing on the Soviet Union while the Weapons Systems Evaluation Group assessed SAC's ability to strike Soviet targets in February 1950.

Before the Administration had an opportunity to examine the studies of strategic air war, the interservice feud captured public attention in the "Revolt of the Admirals." Spurred by the April 23, 1949 cancellation of the *U.S.S. United States* by the new Secretary of Defense Louis A. Johnson, Mr. Cedric R. Worth, a civilian assistant to the Undersecretary of the Navy, released to the press an anonymous document that charged Johnson and the Air Force with fraud in the procurement of the Convair B-36 bomber. Instead of providing a state-of-the-art intercontinental bomber, the plane represented a "billion dollar blunder." The publicity generated by the allegations prompted an investigation by the House Armed Services Committee headed by Congressman Carl Vinson. A session held from August 9-25, 1949 examined Worth's allegations. The hearings found not "one iota, not one scintilla of evidence . . . that would support charges that collusion, fraud, corruption, influence, or favoritism played any part whatsoever in the procurement of the B-36 bomber."⁷ Undeterred, the Navy still

⁶ Rearden, *The Formative Years 1947-1950*, p. 403.

⁷ U. S. Congress, House, Committee on Armed Services, *Investigation of the B-36 Bomber Program*, 81st Congress, 1st Session, 1949, p. 654; Roarden, *The Formative Years, 1947-1950*, pp. 410-420; Donovan, *Tumultuous Years*, pp. 106-113.

viewed the Air Force B-36 program as a challenge to its mission.

Dissatisfied with the first round of Congressional hearings, Captain John G. Crommelin, a respected, highly decorated naval officer, launched a second round of testimony when he told reporters that the Navy was being "nibbled to death." Crommelin's statement unleashed the frustrations of senior naval officers who felt their service jeopardized by Air Force doctrinal claims. The second session focused on the Navy's challenge to the theory and morality of strategic bombing. On the other hand, Chairman of the Joint Chiefs of Staff General Omar N. Bradley and Air Force Chief of Staff General Hoyt S. Vandenberg refuted Navy claims and backed the performance of AAF bombers during World War II. After rounds of heated testimony, the Armed Services Committee refrained from attempting to resolve professional military disagreements and proposed no interference with the B-36 program.⁸ In many ways similar to the tactics of Billy Mitchell twenty-five years earlier, the Navy raised some valid points during the investigation. However, like Mitchell's appeals, vitriolic rhetoric overshadowed sound reasoning. Lost in the spectacle were astute Navy criticisms of the inadequate intelligence foundation of current war plans. Instead of a Congressional circus, the Navy should have insisted upon a review of Air Force strategic intelligence capabilities in the proper forum.

By 1949, Air Force electronic reconnaissance provided the bulk of "hard intelligence" on Soviet defenses. Directed by the Joint Chiefs of Staff to conduct "an aggressive program to obtain the maximum amount of intelligence concerning foreign electronic developments," the Air Force drafted the USAF

⁸U.S. Congress, House, Committee on Armed Services, *The National Defense Program: Unification and Strategy*, 81st Congress, 1st Session, 1949; Omar N. Bradley and Clay Blair, *A General's Life* (New York: Simon and Schuster, 1983), pp. 506-513; Meilinger, *Hoyt S. Vandenberg*, pp. 130-137; Rearden, *The Formative Years*, pp. 410-420; Donovan, *Tumultuous Years*, pp. 106-113.

Electronic Reconnaissance Program on July 21, 1949.⁹ At the heart of the program, the Strategic Air Command assumed responsibility for electronic reconnaissance. Although theater commanders still covered their respective areas with available resources, SAC coordinated efforts and asserted operational control.¹⁰ Additionally, the USAF Electronic Reconnaissance plan outlined the aircraft and organizational plans, mission and deployment guidelines, intelligence requirements, mission reporting procedures, and applicable directives which superseded previous organizational efforts.¹¹ With this program, the Air Force furthered the bureaucratic reforms begun the previous year.

SAC's 324th Strategic Reconnaissance Squadron, Electronic, conducted the revised electronic reconnaissance program.¹² To increase collection, the Air Force planned to replace the unit's planes with new RB-50B Ferret aircraft by June 1950. Although the RB-50 closely resembled the RB-29 in appearance and speed, the new aircraft offered greater payloads and superior

⁹ Letter, Lauris Norstad, Lieutenant General, USAF, Deputy Chief of Staff, Operations, to Commanding General, Strategic Air Command, Subject: USAF Electronic Reconnaissance Program, 21 Jul 1949, TS Control number: 2-8169, File: 2-8100 to 2-8199, Box 45, Entry 214, RG 341, NA; R&R, Goodman G. Griffin, Jr., Lt. Colonel, USAF, Executive, Air Intel. Req. Div., Directorate of Intelligence, to Commanding General, Strategic Air Command, Subject: Letter of Transmittal, Jan 2, 1950, TS Control number: 2-10681/10, File: 2-10600 to 2-10699, Box 47, Entry 214, RG 341, NA.

¹⁰ Letter, John M. Schweizer, Jr., Colonel, USAF, Executive, Directorate of Intelligence, to Director of Communications, Subject: Proposed Plan for Air Force Electronic Reconnaissance Program, 27 Apr 49, TS Control number: 2-7268, File: 2-7200 to 2-7299, Box 45, Entry 214, RG 341, NA.

¹¹ Letter, Norstad to CG, SAC, USAF Electronic Reconnaissance Program, 21 Jul 49, NA.

¹² The Air Force "redesignated" units frequently during the immediate postwar period. The 324th Strategic Reconnaissance Squadron, Electronic replaced the 324th Strategic Reconnaissance Squadron, ECM on 14 March 1949. General Order Number 15, Headquarters, Strategic Air Command, Offutt Air Force Base, Omaha, Nebraska, 14 March 1, 49 in *The Strategic Air Command 1949*, Vol. 8: *General Orders 1-78*, File number: 416.01, vol.8, 1949, USAFHRC.

range.¹³ As a result, the squadron deployed two aircraft with trained crews to each reconnaissance base in the United Kingdom, Alaska, and Japan for operational sorties while four aircraft remained in the United States for training.¹⁴ While the reconnaissance plan continued the Ferret's mission to explore unknown areas and electronic frequencies, the program also emphasized the need to repeat coverage of existing sites. Only through repetition could analysts identify details, detect anomalies, and determine trends which provided intelligence insight.¹⁵ Thus, by centering electronic reconnaissance in one organization, the Air Force hoped to keep abreast of current intelligence on foreign electronic activity.

In order to focus Ferret efforts, the USAF Electronic Reconnaissance Program established specific intelligence requirements. The first requirement resembled earlier directives that sought information on the location, characteristics, and capability of foreign radar. The Air Force also ordered a search of the electronic spectrum for evidence of Soviet research and development. Air Force Intelligence sought clues to Soviet advances in electronics, guided missiles, and pilotless aircraft. To aid efforts, the plan

¹³ For a basic mission, an RB-29A was capable of 329 knots at 25,000-foot altitude under maximum power, a 4,075 nautical mile range at best endurance airspeed, and a 35,000-foot service ceiling. An RB-50G (the eventual model used for Ferret missions which included additional electronic equipment) performed only slightly better with a 338 knot speed at 31,000 feet under maximum power, a 5,050 nautical mile ferry range, and a 32,900 foot service ceiling. However, the RB-50 could carry nearly 20,000 pounds of additional fuel and equipment. *Standard Aircraft Characteristics, RB-29A Superfortress*, Boeing, 19 April 1950, File: (R)B-29A/char, Air Force Museum (AFM), Wright-Patterson Air Force Base, Ohio; *Standard Aircraft Characteristics, RB-50G Superfortress*, Boeing, 16 Oct 1953, File: (R)B-50G/char, AFM.

¹⁴ USAF Electronic Reconnaissance Program, Tab B, p. 1, 21 Jul 49, NA.

¹⁵ Letter, Schweizer to Director of Communications, Proposed Plan for Air Force Electronic Reconnaissance Program, 27 Apr 49, NA; USAF Electronic Reconnaissance Program, 21 Jul 49, Tab C, pp. 2-3, NA.

provided a prioritized list of frequency bands.¹⁶ With this information, analysts could map enemy radar nets, determine radar detection capabilities, and assess Soviet electronic potential. For the immediate future, the Air Force wanted to confirm the transition of Soviet radar defenses from foreign (British and American lend-lease equipment and captured German and Japanese sets) to sets of Russian design and manufacture.¹⁷

In sum, the USAF Electronic Reconnaissance Program completed efforts to centralize strategic intelligence within the Air Force. The plan coordinated collection efforts with the needs of higher headquarters. Nevertheless, the program focused on peacetime reconnaissance and failed to address wartime needs. No formal planning requirements existed for the number of target reconnaissance missions, bomb damage assessment sorties, or pioneer flights for new targets.¹⁸ Additionally, no plan matched existing capability with anticipated wartime reconnaissance sorties. Thus, the new program proved useful for streamlining peacetime reconnaissance efforts, but it failed to prepare the Air Force for strategic air war.

Following the Berlin Crisis, a new SAC commander, Lieutenant General Curtis E. LeMay entirely revamped the Strategic Air Command. From his former perspective as Commander of USAFE, LeMay viewed SAC as an empty facade

¹⁶ The plan called for study of the following frequency bands (in priority order):

- a. 40-400 mcs.
- b. 2600-3000 mcs.
- c. 400-600 mcs.
- d. 600-2000 mcs.
- e. 2000-2600 mcs.
- f. 3000 - up mcs.
- g. 20-40 mcs.

USAF Electronic Reconnaissance Program, 21 Jul 49, Tab C, p. 2, NA.

¹⁷ Ibid., p. 1.

¹⁸ Letter, Von R. Shores, Col, USAF, Act. Ass't Chief, Operations Div, Director, Plans & Operations, to Air Intelligence Requirements Division, D/I, Subject: Intelligence Requirements for Strategic Reconnaissance, Jul 15, 1949, TS Control number: 2-8323, File: 2-8300 to 2-8399, Entry 214, RG 341, NA.

that lacked any real combat capability. As a result, he directed a change in emphasis from "providing" strategic air forces to "operating" a combat-ready strike force.¹⁹ To dramatize his point, in January 1949, LeMay ordered an operational readiness test of the entire command by conducting a simulated attack on Dayton, Ohio. Bomb units received target materials and maps based on a 1938 photograph of the target, Wright Air Force Base. Instead of allowing daylight attacks at moderate altitudes, reflecting current SAC training, LeMay ordered the planes to strike at night, in bad weather, and with radar bombing techniques. The results backed LeMay's assessment: "not one crew finished the mission as briefed, not one."²⁰

Reflecting LeMay's influence, SAC concentrated upon developing an intercontinental strike force, capable of hitting its assigned targets. Efforts intensified to improve bombing accuracy, to develop air-to-air refueling techniques, and to transition from the B-29 to the long-range B-36 and B-50.²¹ Plus, headquarters personnel struggled to define the mission for each unit, to identify the specific tasks required for mission success, and to design training plans to accomplish these tasks. For SAC reconnaissance, a series of discussions between SAC Headquarters, Air Force Intelligence, and the 311th Air Division in August 1949 identified six essential tasks:

1. Radar Scope Photography.
2. Bomb Damage Assessment Photography.
3. Target Verification Photography.
4. "Pioneer" or Target Development Photography.
5. Procurement of Weather Intelligence under combat conditions.
6. Procurement, by Ferret methods, of intelligence concerning enemy

¹⁹ Historical Section, Strategic Air Command, *History Strategic Air Command 1949* (n.p.: Headquarters Strategic Air Command, 10 May 1950) Vol. I: *Narrative*, p. 1.

²⁰ Curtis E. LeMay, General, USAF, United States Air Force Oral History Program, Interview #736 by John T. Bohn, 9 March 1971, March AFB, California, File: K239.0512-736, 9 Mar 1971, USAFHRC; Borowski, *A Hollow Threat*, pp. 166-168.

²¹ *History of Strategic Air Command 1949*, Vol. 1, p. 62, USAFHRC.

electronic emissions.²²

For each task, intelligence requirements established performance criteria. For example, target verification photography sought to attain the following standard:

- (1) First Priority -- Photography of sufficient interpretability to distinguish thirty (30) foot cubes thirty (30) feet apart within each target complex (urban area), and of sufficient coverage (60-70 square miles for the average target) to permit the production of photographic target materials.
- (2) Second Priority -- Photography of sufficient interpretability covering certain installations selected . . . to determine the functions, production rates, and structural compositions of such installations. . . .²³

Unfortunately, existing political and technological limits prevented SAC reconnaissance from accomplishing these tasks. In an effort to overcome its shortcomings, the 311th Air Division recommended two technical innovations. In March 1949, the 311th Air Division proposed equipping RB-36 aircraft with TV-guided drones. The RB-36 would operate at 40,000 feet and fly its drone to lower altitudes. In another proposal, the RB-36 would carry one or more reconnaissance-modified fighter aircraft within fighter range of targets, launch the planes to photograph targets, and then carry the smaller jet back to home base. Although the Air Force tested the feasibility of parasite fighters for the B-36, the appearance of jet RB-45 and RB-47 prototypes shelved consideration of the drones.²⁴

During this period of SAC reorientation, peripheral reconnaissance sorties continued along Soviet borders. Pointing to the intelligence benefit gained from long-range photography of Northeastern Siberia in 1948, the

²² Ibid., p. 121.

²³ Letter, Thomas S. Power, Major General, USAF, Deputy Commander (SAC), to Commanding General, 311th Air Division, Subject: Photographic Reconnaissance Requirements, 16 Aug 49, Tab 106, *History Strategic Air Command 1949*, Vol. 3: *Supporting Documents, Operations and Training, Exhibits 59 -- 119*, File: 416.01, v.3, Jan-Dec 1949, USAFHRC.

²⁴ *History of Strategic Air Command 1949*, Vol. 1, pp. 122-124, USAFHRC.

Commander of the Alaskan Air Command received permission to repeat photographic coverage of the Chukotski Peninsula. As a result, RB-29 aircraft equipped with K-30, 100-inch focal length cameras covered twenty targets on the Soviet coastline.²⁵ The photography tracked Soviet efforts to stockpile equipment and improve airfields which might indicate preparations for attack.²⁶ To assess the reliability of the reconnaissance, the Alaskan Air Command also conducted Project STONEWORK which photographed portions of the Alaskan coast under the same conditions for comparison.²⁷

In Europe, electronic reconnaissance flights marked the transition of Soviet air defenses to Russian designed radars. Ferrets gathered signals of 72 megacycles (mc), which indicated RUS-2 radars at seven additional locations on the Baltic coast.²⁸ In an effort to extend the range of electronic reconnaissance, Colonel John M. Schweitzer, Jr. suggested the employment of B-29s from the 509th Bomb Group for supplemental reconnaissance missions. He reasoned that such electronic search missions would increase the appreciation of electronic warfare by bomber crews and provide realistic

²⁵ The coastal targets ranged from Ambarchik to Petropavlovsk and included Ostrov Vrangelya, the Kommandorski Islands, and the Northern Kuriles. Letter, Frank A. Armstrong, Jr., Brigadier General, USAF, Commanding, to Chief of Staff, Headquarters U.S. Air Force, Subject: Photographic Coverage of Northeastern Siberia, 7 Nov 1949. TS Control number: 2-10097, File: 2-10000 to 2-10099, Box 46, Entry 214, RG 341, NA.

²⁶ The Air Force assumed that airfields in Northeastern Siberia would serve as bases for Soviet B-29s aimed at the U.S. Hence, surveillance of these airfields provided a degree of warning from surprise attack. 1st Ind, N. F. Twining, Lt Gen, USAF, Commander-in-Chief, Alaskan Air Command, to Chief of Staff, United States Air Force, n. d., TS Control number: 2-10097, File: 2-10000 to 2-10099, Box 46, Entry 214, RG 341, NA.

²⁷ R&R, Edward Barber, Colonel, USAF, Deputy, Air Intel. Req. Div., Directorate of Intelligence to Operations Division, DCS/O, ATTN: Col J. Tison, 10 Aug 1949, TS Control number: 2-8639, File: 2-8600 to 2-8699, Box 45, Entry 214, RG 341, NA.

²⁸ Ferrets discovered Soviet radars in the following areas: Rostock, Eugen Island, Swinemunde, Kolberg, Kostin, Vietzkerstrand, and the Hel Peninsula. Letter, Richard P. Klocko, Colonel, U.S.A.F., Chief, Developmental Research Br., Air Intelligence Div., Director of Intelligence, to Commanding General, United States Air Forces in Europe, Subject: Comments on Biograph Missions, Jul 13 1949, TS Control number: 2-8303, File: 2-8300 to 2-8399, Box 45, Entry 214, RG 341, NA.

training for ECM operators in addition to further intelligence collection.²⁹ The Air Staff quickly silenced the proposal because the 30 SILVERPLATE B-29s of the 509th Bomb Group represented the only atomic capable aircraft in SAC. The potential ramifications of a mishap or incident involving planes and crews intended for atomic delivery outweighed any intelligence or training gain.³⁰

Despite the regularization of strategic reconnaissance and apparent organizational improvements, poor results threatened the electronic reconnaissance program. Throughout 1949, the intelligence information collected from Ferret missions declined. Alaskan and FEAF sorties in particular reported "negative results" with increased frequency. Since electronic reconnaissance represented the primary source of USAF intelligence, the Air Staff conducted an immediate review of Ferret procedures. According to Major General F. L. Ankenbrandt, Director of Communications, the Soviets determined Air Force reconnaissance methods and he blamed indiscriminate use of airborne radar for navigation as the immediate cause of Ferret detection by the Soviets.³¹ When USAF reconnaissance planes entered an area, the Soviets simply switched off their radar equipment. Consequently, the study suggested steps to prevent the tip-off of Ferrets. Nevertheless, the frustrating experience reinforced the difficulty of collecting intelligence against the Soviet Union.

What types of intelligence assessment did the Air Force produce as a result of its strategic reconnaissance program? The answer to this question

²⁹ Letter, John M. Schweitzer, Jr., Colonel, USAF, Executive, Directorate of Intelligence, to Director of Communications, Operations Division, D/P&O, Subject: Proposed Supplemental Electronic Reconnaissance Operations, Jun 10 1949, TS Control number: 2-7893-A, File: 2-7800 to 2-7899, Box 45, Entry 214, RG 341, NA.

³⁰ Letter, Von R. Shores, Col, USAF, Act. Ass't Chief, Operations Div, Director, Plans & Operations, Subject: Proposed Supplemental Electronic Reconnaissance Operations, 13 Jun 1949, TS Control number: 2-7893-A, File: 2-7800 to 2-7899, Box 45, Entry 214, RG 341, NA.

³¹ R&R, F. L. Ankenbrandt, Major General, USAF, Director of Communications to Director of Intelligence, DCS/O, Subject: Ferret Missions Reporting Negative Results, 17 Mar 1949, TS Control number: 2-6748, File: 2-6700 to 2-6799, Box 44, Entry 214, RG 341, NA.

assumed a pivotal role in the interservice debate over budget allocations and force structure during 1949. Increased funding for the B-50 and B-36 bomber programs as well as the new jet bombers depended upon the viability of strategic bombing doctrine. In addition, the undisputed power of an air-atomic strategy, whether as deterrent of war or punishment for aggression, provided the justification for keeping manpower levels low, particularly for the ground services. Therefore, Air Force threat assessment contained important fiscal ramifications as well as strategic impact.

Formed largely from information gained from U.S. electronic reconnaissance flights, the Air Force assessment of the Soviet threat depicted a powerful, unwieldy colossus featuring large numbers of technologically backward weapons. Air Intelligence worried about the Soviet development of weapons of mass destruction, the means to deliver atomic weapons, and Soviet defenses against U.S. air power. In 1949, the Joint Intelligence Committee produced a series of reports closely based upon Air Force Intelligence assessments of Soviet atomic status, Soviet bombers, guided missiles, radars, ECM, and anti-aircraft guns.

With JCS war plans based upon an American monopoly of atomic weapons, the Soviet development of atomic bombs ranked as the greatest concern of American military leaders. According to a Joint Nuclear Energy Intelligence Committee (JNEIC) estimate of July 1, 1949, the earliest possible date for a Soviet atomic bomb was mid-1950 and the most probable date appeared to be mid-1953. Available evidence indicated Soviet research aimed for the production of a plutonium bomb. With the amount of uranium ore as the limiting factor, the JNEIC predicted a 60-bomb atomic stockpile by mid-1955 and 150 bombs by 1957 based upon a 1953 initial date. If the Soviets achieved

the earliest possible date of 1950, their atomic stockpile could number as many as 130 bombs by 1955 and 150 by 1957.³² Nevertheless, the Soviet possession of atomic weapons proved less a concern if they lacked the means to "deliver" the bomb. As a result, Air Force reconnaissance missions searched for information related to Soviet aircraft and missile production.

According to Air Force Intelligence, the Soviet aviation industry posed a moderate threat to the United States in 1949. Air Force analysts considered the Tupolev Tu-4, a Soviet copy of the B-29, as the most likely means to drop atomic bombs.³³ With a 10,000-pound bomb load (the approximate weight of early atomic bombs), the Air Force estimated the Soviet B-29 to have an 1,800 nautical mile combat radius; however, the range could be further extended to 2,150 nautical miles by stripping the bomber of defensive armament and extra crewmembers. Therefore, from bases on the Chukotski Peninsula, two-way missions for Soviet B-29s could attack Seattle, Washington and one-way strikes could reach Wichita, Kansas.³⁴ Although strategic reconnaissance showed no long-range bombers based in Northeastern Siberia, Air Force Intelligence considered airfields at Anadyr/Russkaya and Uelen capable of staging approximately 200 Soviet B-29s.³⁵ In other words, the Soviet bomber force presented a potential threat to the United States.

Soviet missile developments represented a greater concern. The Air

³² Notice that the estimates show a more rapid build-up of the Soviet atomic stockpile, but the same number of bombs. This is due to estimates of limited quantities of uranium ore available to the Soviets that would limit their total capacity. MFR, Status of the U.S.S.R. Atomic Energy Project -- 1 July 1949, (Joint Nuclear Energy Intelligence Committee), TS Control number: 2-8151, File: 2-8100 to 2-8199, Box 45, Entry 214, RG 341, NA.

³³ Contemporary documents do not identify the Tu-4 by name. Instead, they refer to the aircraft as "the Soviet B-29." I have adopted this practice.

³⁴ R & R, Frank P. Sturdivant, Colonel, USAF, Executive, Air Intelligence Division, Directorate of Intelligence, to Industrial Planning Division, Directorate of Procurement and Industrial Planning, Subject: Strategic Consideration Re Boeing Aircraft Production, 12 Aug 1949, TS Control number: 2-8670, File: 2-8600 to 2-8699, Box 45, Entry 214, RG 341, NA.

³⁵ Ibid.

Force Directorate of Intelligence credited the Soviets with the capability for producing surface-to-surface guided missiles based on the German V-2 by 1952. In addition, analysts anticipated an improved V-1 type missile able to be launched from a submarine against coastal installations.³⁶ For defense, the Soviets appeared to be developing the German *Wasserfall* surface-to-air missile, the *Mannheim* system for target detection, and the *Wurzburg-Reise* radar for tracking.³⁷ Although no electronic missile guidance system would be deployed before mid-1950, Air Material Command sought additional Ferret information in order to design countermeasures.

In comparison to information about Soviet offensive capability, knowledge of Soviet aerial defenses seemed abundant. Assessments of Soviet radar networks in 1949 benefited from two years of Ferret flights. Although Air Intelligence lacked basic knowledge about the capability of the Soviet electronics industry, analysts formed a better picture of the Soviet Early Warning network. According to electronic reconnaissance, the Soviets assembled a radar chain from Finland to Albania in Europe and from Wrangel Island to Korea in the Far East. The initial chain featured captured German and Japanese equipment and US and British Lend-Lease radar sets. After a period from autumn 1948 to mid-1949, where electronic intercepts dropped off significantly, reconnaissance indicated the transition to a Soviet-designed RUS-2 early warning radars.³⁸ Analysts surmised that the switch occurred for one or all of

³⁶ "Intelligence Annex for the Air Force Research and Development Plan for the Fiscal Year 1952," 12 Aug 1949, TS Control number: 2-8184A, File: 2-8100 to 2 8199, Entry 214, RG 341, NA.

³⁷ Letter, D. L. Putt, Brigadier General, USAF, Director of Research & Development, Office, Deputy Chief of Staff, Materiel, to Directorate of Intelligence, DCS/O, Subject: Countermeasures to Soviet Guided Missiles, 22 Dec 1948, TS Control number: 2-7817, File number: 2-7800 to 2-7899, Box 45, Entry 214, RG 341, NA.

³⁸ JCS 1952/8, Joint Intelligence Estimate for Basing Operational Evaluation Success of the Strategic Air Offensive, 25 Aug 49, Appendix C, p. 92, RG 218, NA.

the following reasons:

- a. A shortage of spare parts has forced the junking of radars of foreign manufacture.
- b. A desire on the part of the Soviets to provide maximum protection for centers within the USSR has resulted in the withdrawal of foreign designed radars, which are superior in performance to Soviet radars from peripheral areas to areas inside the Soviet Union. Radar defenses in the peripheral areas are being assumed by radars of Soviet design.
- c. The problem of training operators and maintenance personnel for foreign equipment has proved to be too difficult; it has therefore become necessary to substitute Soviet radars on a wholesale basis, these radars being simpler to operate and maintain.³⁹

Air Force Intelligence estimated that the Soviets constructed early warning radar networks along the anticipated flight paths of US bombers and in the vicinity of Moscow, Leningrad, Murmansk-Arkhangelsk, and the Baku oil region, but no supporting evidence existed.⁴⁰ In qualitative terms, Air Force technicians rated the RUS-2 an elementary device with little anti-jamming protection, but it would provide warning of approximately 100 miles.⁴¹

Although Ferret aircraft provided good coverage of Soviet radars on the periphery of the Soviet Union, they could not provide details for Soviet defenses within the USSR. As a result, analysts for Air Force Intelligence and the Joint Intelligence Committee resorted to speculation for the remaining components of Soviet air defenses. American radar specialists believed that the Soviets possessed a limited Ground-Controlled Intercept (GCI) and Airborne Intercept (AI) capability. They reasoned that the Soviet employed former Lend-Lease

³⁹ JCS 1952/8, 25 Aug 49, Appendix C, p. 93, RG 218, NA.

⁴⁰ JCS 1952/8, Appendix C, p. 94, NA.

⁴¹ JIC 439/13, Joint Intelligence Committee Estimate on Basing Operational Evaluation of Prospects of Success of Strategic Air Offensive, 22 Aug 1949, pp 1-5 & p. 11, File: CCS 373 (10-23-48) sec 4, RG 218, NA.

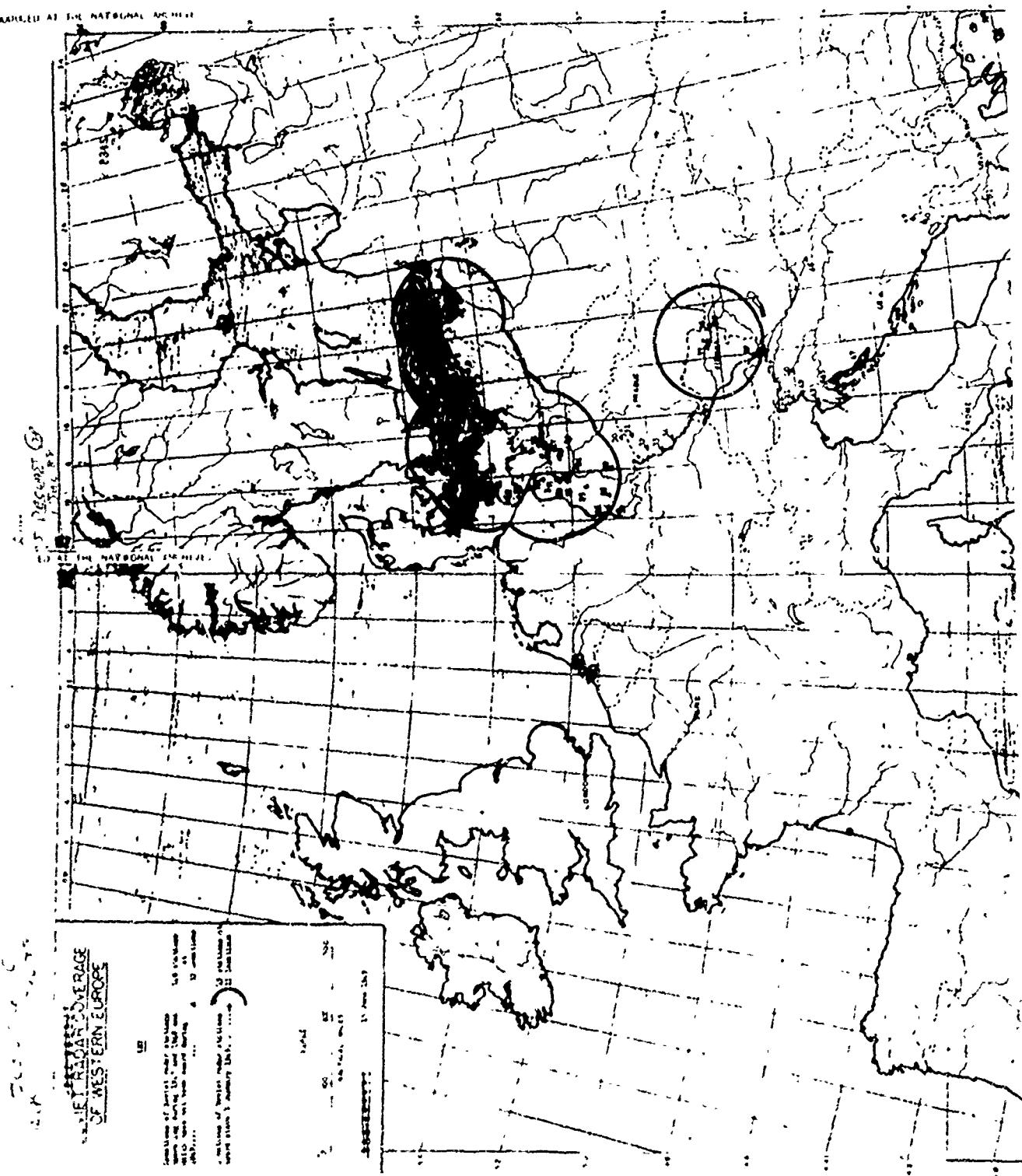
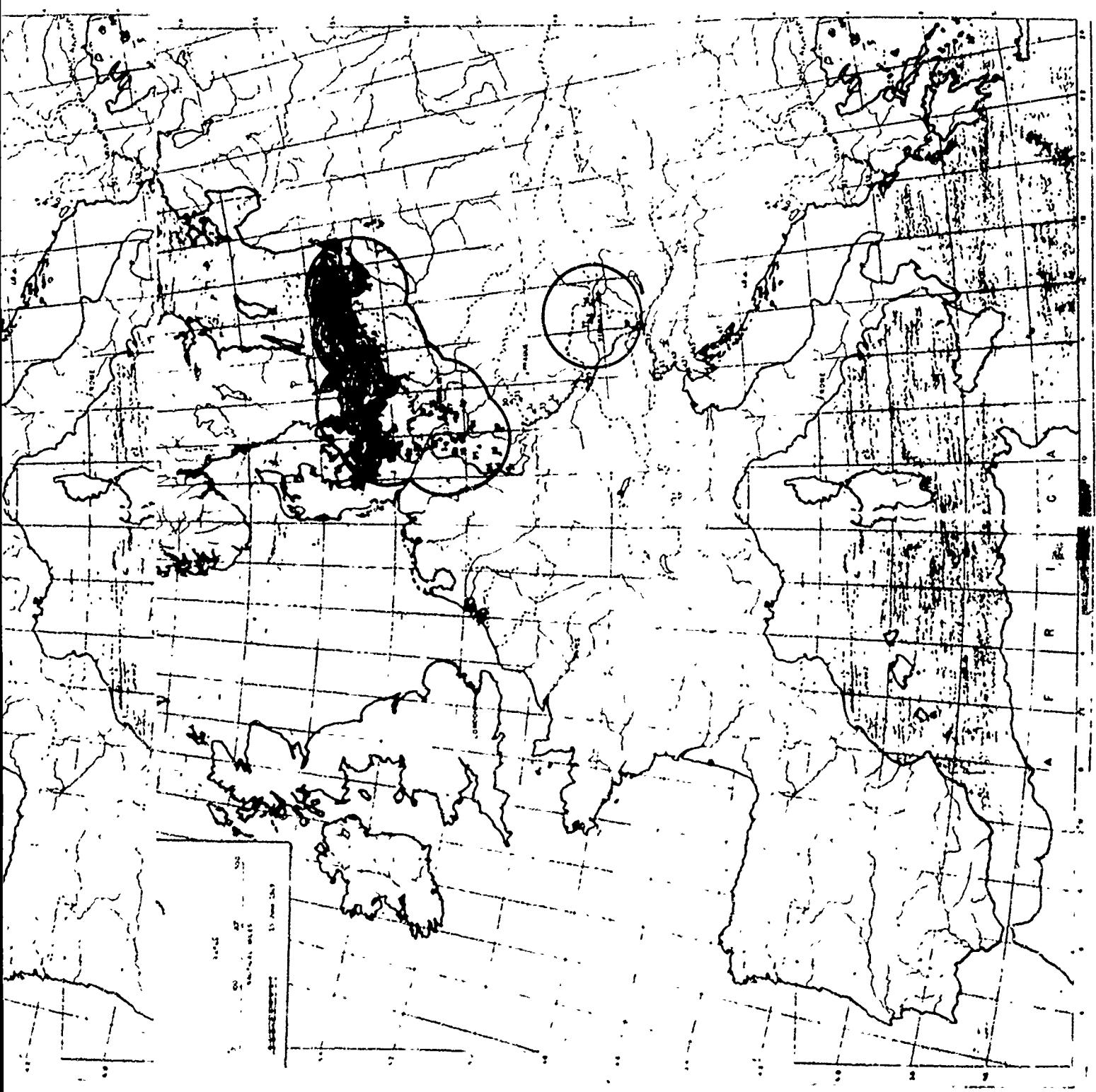


FIGURE 3. Soviet Radar Coverage in Western Europe



Soviet Radar Coverage in Western Europe

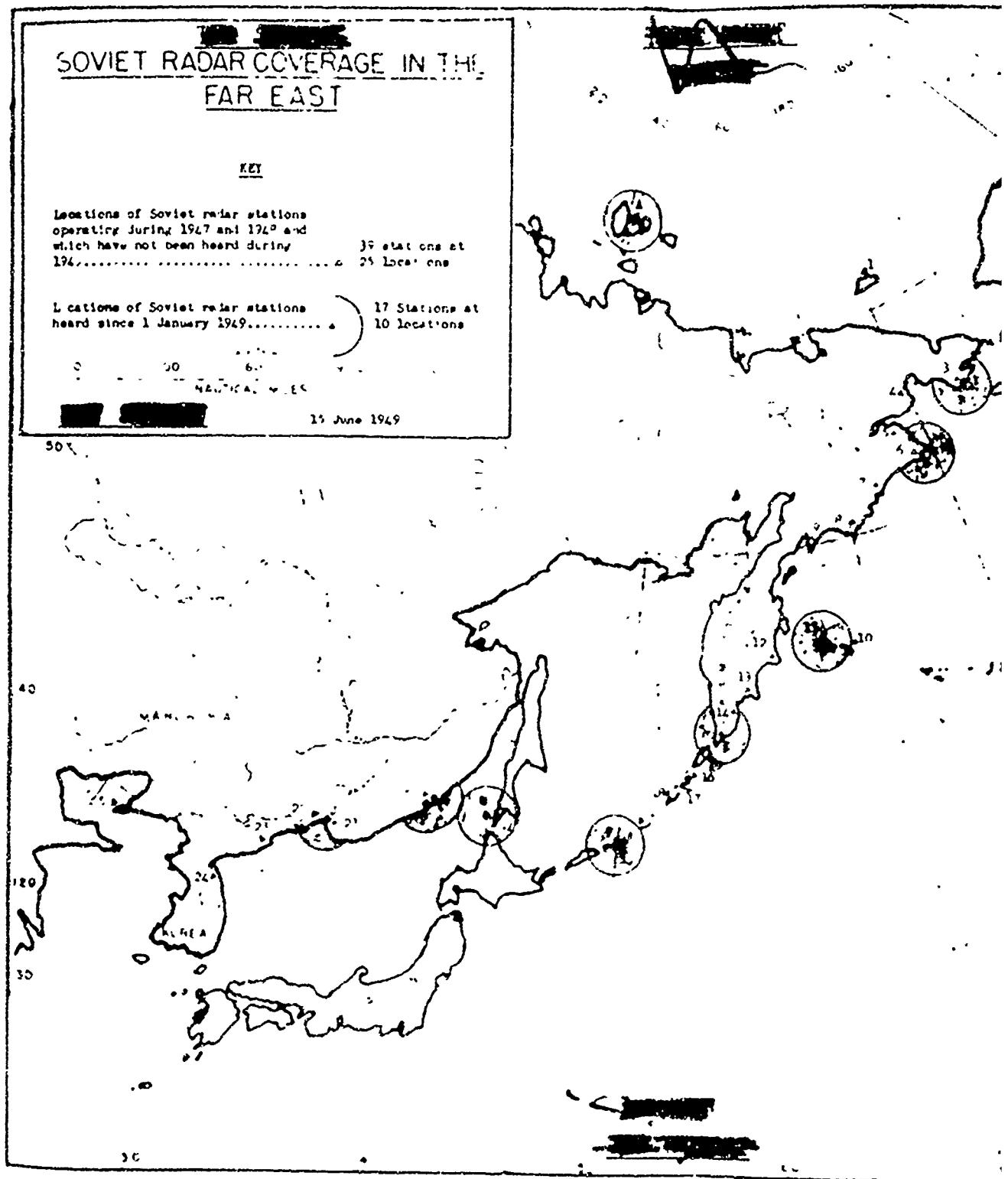


FIGURE 4. Soviet Radar Coverage in the Far East

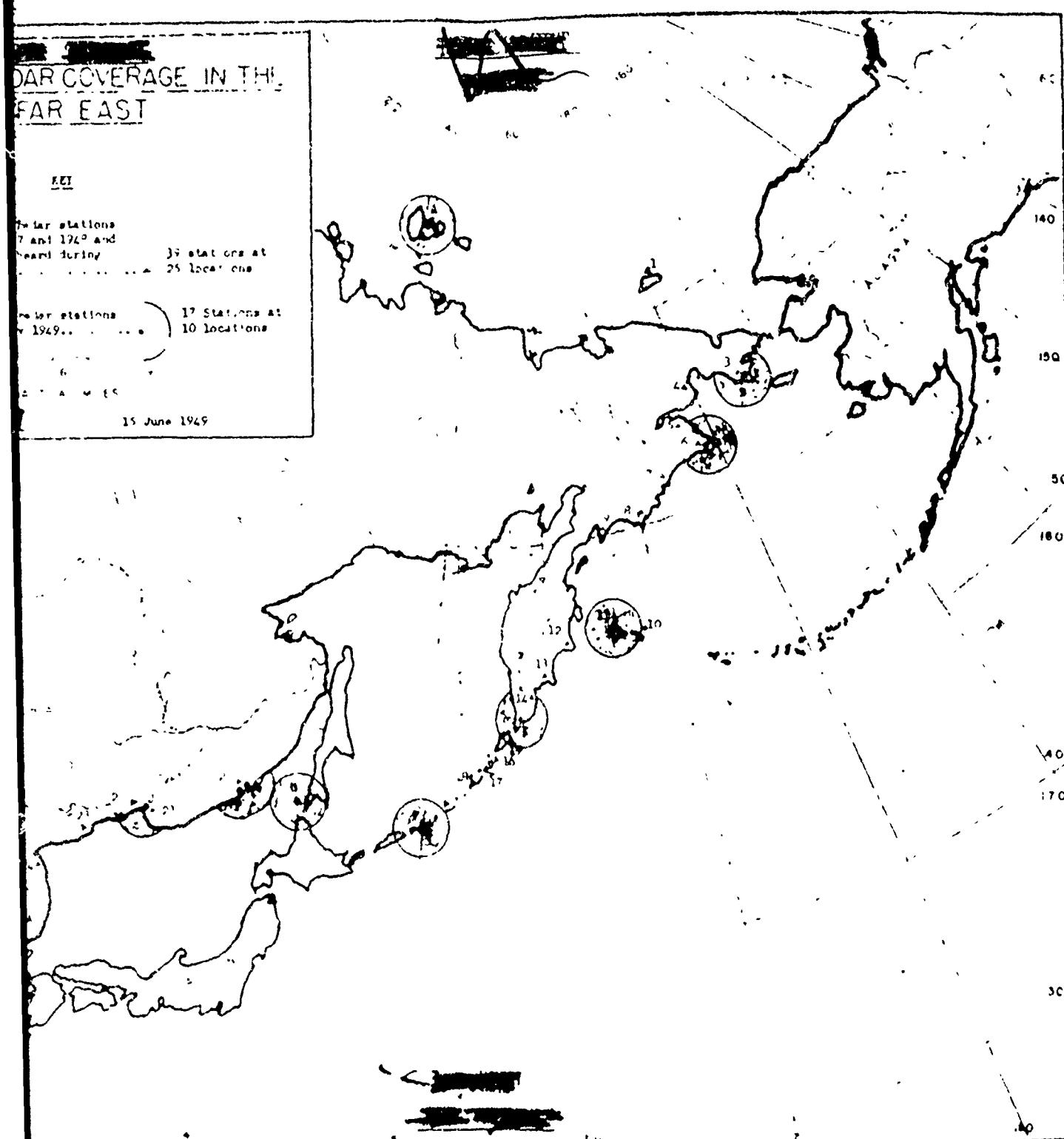
RADAR COVERAGE IN THE
FAR EAST

KEY

Radar stations
7 and 1949^o and
heard during
..... 37 stations at
..... 25 locations

Radar stations
in 1949... 17 Stations at
..... 10 locations

25 June 1949



Soviet Radar Coverage in the Far East

equipment to form a GCI network for a few critical areas. In addition, the analysts believed the Soviets continued to operate a portion of the 160 AI sets provided by the Allies during the war. Nevertheless, the Joint Intelligence Committee considered the systems a limited threat. Unlike more modern US or British systems, the Soviet equipment lacked protection from jamming and the GCI system possessed limited ability to position a fighter for a firing run.⁴² The JIC considered it "improbable" that the Soviets could overcome production problems associated with microwave tubes. Therefore, analysts believed the Soviets possessed few AI radar capable of operating above 30,000 feet.⁴³ Still, no direct evidence supported these assessments.

Along the same lines, the US intelligence community regarded Soviet anti-aircraft capabilities as inferior. Based upon German assessment of Soviet anti-aircraft artillery (AAA) performance during World War II, the Joint Intelligence Committee rated Soviet fire control systems and AAA shell fuzes lower than comparable Western systems. Despite the shipment of US M-9 and M-10 fire control directors under Lend-Lease and the Soviet capture of Germany's latest system, the *Kommandogerat 41E*, available intelligence showed no Soviet modifications or use of the systems. In addition, the US possessed no intelligence on whether the Soviets were using eighty British and American SCR-584 anti-aircraft radar.⁴⁴ Despite this lack of information, Air Force Intelligence and the JIC doubted that Soviet air defenders had overcome their technological backwardness.

In April 1949, the Joint Chiefs of Staff directed the Joint Staff Planning Committee to prepare a joint outline emergency war plan for the first two years

⁴² JIC 439/13, 22 Aug 1949, Appendix A, p. 12, NA.

⁴³ JCS 1952/8, Appendix C, p. 96, NA.

⁴⁴ JCS 1952/8, Appendix C, p. 99, NA.

of a war beginning on July 1, 1949. To comply with President Truman's directions, the plan adhered to the force structure available under the constraints of the Fiscal Year 1950 budget.⁴⁵ As a result, Joint Outline Emergency War Plan OFFTACKLE reflected the difficult decisions forced by those with limited means trying to accomplish virtually unlimited ends.⁴⁶ Consequently, OFFTACKLE represented the epitome of US reliance on an air-atomic strategy.⁴⁷

In many respects, OFFTACKLE continued the strategic thinking of the Joint Emergency War Plans PINCHER and BROILER. Like its predecessors, OFFTACKLE proposed an overall strategic concept based on the destruction of the Soviet will and capacity to resist. In order to accomplish this, the plan repeated "basic undertakings" seen before: the defense of the Western Hemisphere and strategic bases worldwide, a limited defense of Europe and the Far East, a strategic air campaign to destroy Soviet vital centers and provide time for US mobilization, and an eventual counterattack in "Western Eurasia."⁴⁸ In addition, OFFTACKLE presented a revised version of US war aims based on NSC 20, a policy statement approved by the President:

⁴⁵ JCS 1844/46, Joint Emergency Outline Emergency War Plan "OFFTACKLE," 8 November 1949, p. 345 in Steven T. Ross and David Alan Rosenberg, eds., *America's Plans for War Against the Soviet Union* (New York: Garland Publishing, 1989), Vol. 12: *Budgets and Strategy: The Road to Offtackle*. See also the introduction to the volume for a summary of OFFTACKLE, n. p. {p. vii}.

⁴⁶ On May 19, 1948, the Joint Chiefs of Staff approved a short-range emergency war plan named HALFMON. That closely followed the concepts of war plan BROILER. Although HALFMON called for the destruction of 70 Soviet cities with 133 atomic bombs, the plan differed little from the preceding series. Since OFFTACKLE represents the plan under discussion during the most bitter interservice feuding and the most recent of the declassified war plans, I consider it more useful for analysis. For a summary of HALFMON, see Steven T. Ross, *American War Plans 1945-1950* (New York: Garland Publishing, 1988), pp. 89-98.

⁴⁷ Ross and Rosenberg, eds., Vol. 12: *Budgets and Strategy*, n. p. {p. vii}.

⁴⁸ JCS 1844/37, Preparation of a Joint Outline Emergency War Plan, 27 April 1949, p. 266 in Steven T. Ross and David Alan Rosenberg, eds., *America's Plans for War Against the Soviet Union* (New York: Garland Publishing, 1989) Vol. 12: *Budgets and Strategy: The Road to Offtackle*; JCS 1844/46, Enclosure, p. 350.

- a. To reduce the power and influence of the USSR to limits which no longer constitute a threat to the peace, national independence and stability of the world family of nations.
- b. To bring about a basic change in the conduct of international relations by the government in power in Russia to conform with the purposes and principles set forth in the United Nations Charter.⁴⁹

Finally, the war plan featured a four-phase strategic air offensive that intended to knock-out Soviet war capacity through atomic attacks on Soviet cities. In this plan, the bulk of the atomic offensive was to be launched in the first three months.⁵⁰ Depending on the success of the first phase, the remaining three phases outlined a general "policing" of target systems already attacked and the "full exploitation" of opportunities created.⁵¹ In many ways, OFFTACKLE confirmed the earlier doctrinal shift from precision bombardment to urban area attack with atomic weapons.

Despite its many similarities, OFFTACKLE differed from earlier war plans in a few key areas. Although not emphasized heavily, the plan acknowledged the need for European allies and the importance of providing aid to them. OFFTACKLE also recognized opportunities to "[e]xploit . . . the psychological weaknesses of the USSR and its satellites by informational activities and other special operations."⁵² Finally, OFFTACKLE presented "calculated risks" due to inadequate budgets:

- a. The ground forces deployed during the first year of the war will not all have the full combat equipment specified in current tables of organization and equipment. However, deficiencies in equipment are not serious enough to invalidate the plan. . . .
- b. The prospective shortage of aircraft and parts therefore (*sic*) is such that reduced operational rates may have to be accepted.

⁴⁹JCS 1844/46, Enclosure, p. 348.

⁵⁰Ibid., p. 358 & p. 366.

⁵¹Ibid., p. 406.

⁵²JCS 1844/37, p. 267 & JCS 1844/46, Enclosure, p. 350.

c. In addition, certain logistic deficiencies which are not sufficiently serious to invalidate the plan will, however, limit combat effectiveness to a varying degree. . . . The deficiencies are:

- (1) Insufficient technical and specialist personnel for units to enable commitment of balanced forces with full logistic support.
- (2) Insufficient supply items in all Services.
- (3) Insufficient construction units in all services.
- (4) An indicated shortage of aviation fuels in the early months.⁵³

Although the JCS considered these risks to be acceptable, a follow-on study declared OFFTACKLE "logistically unfeasible" in terms of aircraft. The Air Force and Navy lacked adequate numbers of carrier-borne aircraft, medium bombers, light bombers, and fighters.⁵⁴ Despite this problem, the report urged acceptance of OFFTACKLE:

Since an undue amount of planning time has already been spent on the current emergency plan, to the detriment of mobilization planning, intermediate range planning, and next year's emergency plan, the Joint

⁵³ JCS 1844/46, 8 December 1949 revision, p. 339.

⁵⁴ Note the failure to mention a shortage of reconnaissance aircraft. Air Force leaders faced so many problems that reconnaissance did not become an overriding priority. OFFTACKLE relied on the following deployment of USAF aircraft:

	D-day	D+1 (month)	D+2	D+3
<u>CONTINENTAL U.S.</u>				
Heavy bomb gp	1	1	1	1
Medium bomb gp	2	-	-	-
<u>ALASKA</u>				
Strat rcn gp	1-2/3	2/3	2/3	2/3
<u>OKINAWA</u>				
Medium bomb gp	1	1	1	1
Strat rcn gp	2/3	1/3	1/3	1/3
Escort ftr gp	1	1	1	1
<u>UNITED KINGDOM</u>				
Medium bomb gp	2	5	6	7
Strat rcn gp	-	1-2/3	2	2
Escort ftr gp	-	3	5	5
<u>ICELAND</u>				
Medium bomb gp		(staging facilities only)		
Strat rcn gp	-	1/3	1/3	1/3

Chiefs of Staff may elect to accept the risk of shortages in OFFTACKLE and approve it as submitted by the Joint Strategic Plans Committee.⁵⁵

On February 8, 1950, the JCS accepted the recommendations and approved OFFTACKLE. Thus, war plan OFFTACKLE served as the formal emergency war plan for Fiscal Years 1950 and 1951.

On May 11, 1949, a committee of Army, Navy, and Air Force officers headed by Air Force Lieutenant General Hubert R. Harmon issued an "Evaluation of Effect on Soviet War Effort Resulting from the Strategic Air Offensive," better known as the Harmon Report. Inspired by Secretary of Defense Forrestal's questions of October 1948, the report examined the impact of the planned strategic air offensive on the war effort of the USSR and included an appraisal of the psychological aspect of the campaign.⁵⁶ Based on an attack of seventy Soviet cities with all assigned targets hit, the report concluded that the SAC atomic offensive would reduce Soviet industrial capacity by thirty to forty percent, kill 2,700,000 people, inflict 4,000,000 additional casualties, and destroy the homes of 28,000,000 city dwellers.⁵⁷ Nevertheless, the psychological effects of the attack would not "bring about capitulation, destroy the roots of communism or critically weaken the power of Soviet leadership to dominate people."⁵⁸ The attack would create a psychological crisis within the USSR between a majority who might view the American bombing as verification of Soviet propaganda and an indeterminate minority who might use the

⁵⁵ JCS 1844/47, Report by the Joint Logistics Plans Committee to the Joint Chiefs of staff on Logistics Implications of "OFFTACKLE," Enclosure, 15 Nov 49, p. 436.

⁵⁶ See pages 96-97 for Forrestal's questions. "Evaluation of Effect on Soviet War Effort Resulting from the Strategic Air Offensive," May 11, 1949 in Thomas H. Etzold and John Lewis Gaddis, eds., *Containment: Documents on American Policy and Strategy, 1949-1950* (New York: Columbia University Press, 1978), p. 361.

⁵⁷ "Evaluation of Effect on Soviet War Effort," p. 362; Rearden, *The Formative Years 1947-1950*, p. 407.

⁵⁸ "Evaluation of Effect on Soviet War Effort," p. 362.

bombing as a pretext for liberation. Against the Soviet armed forces the bombing promised to reduce air, land, and sea mobility through fuel shortages. Finally, the Harmon Report's general conclusion continued the mixed assessment:

Atomic bombing will produce certain psychological and retaliatory reactions detrimental to the achievement of Allied war objectives and its destructive effects will complicate post-hostilities problems. However, the atomic bomb would be a major element of Allied military strength in any war with the U.S.S.R., and would constitute the only means of rapidly inflicting shock and serious damage to vital elements of the Soviet war-making capacity. In particular, an early atomic offensive will facilitate greatly the application of other Allied military power with prospect of greatly lowered casualties. Full exploitation of the advantages to be obtained is dependent upon the adequacy and promptness of associated military and psychological operations. From the standpoint of our national security, the advantages of its early use would be transcending. Every reasonable effort should be devoted to providing the means to be prepared for prompt and effective delivery of the maximum numbers of atomic bombs to appropriate target systems.⁵⁹

In sum, the Harmon Report presented an ambiguous appraisal. It generally supported strategic bombing, but raised important qualifications. By itself, the report failed to settle the interservice dispute. Defense Department officials recognized the need to assess the Harmon Report in conjunction with the feasibility study of the Weapons Systems Evaluation Group (WSEG). Therefore, Secretary of Defense Louis A. Johnson delayed submitting the Harmon Report to the President until the completion of WSEG Report No. 1.

The Weapons Systems Evaluation Group's "Report on Evaluation of Effectiveness of Strategic Air Operations," or Report No. 1, tackled the feasibility of launching a strategic air campaign with existing forces. It evaluated the odds of penetrating Soviet air defenses, the effectiveness of atomic weapons, and SAC's ability to destroy its assigned targets. Composed of a committee of

⁵⁹ Ibid., p. 364.

twenty-two civilian and retired military leaders, the WSEG employed the mathematical techniques of operations analysis to back its claims.⁶⁰ At all stages of its work, the Weapons Systems Evaluation Group adhered to a narrow definition of its mission. Its mammoth report refrained from discussing the impact of the air campaign or the doctrinal assumptions of strategic bombing. Instead, the researchers remained faithful to the original question: could SAC bombers penetrate Soviet defenses and hit their assigned targets?

Because of a lack of intelligence, the WSEG drafted two sets of assumptions concerning Soviet air defenses. The lower level presumed that the Soviets maintained a poorly integrated net of radars and GCI facilities, anti-aircraft weapons little improved over World War II performance, and smaller numbers of jet and conventional interceptor aircraft.⁶¹ In contrast, the higher set of assumptions credited the Soviets with a radar-GCI net that learned from British and German examples, improved anti-aircraft artillery that included unguided rockets based on the German *Taifun* system, and greater numbers of

⁶⁰ Dr. Robert L. Stearns, President of the University of Colorado, served as chairman of the WSEG. Other members included: Henry C. Alexander, Donald F. Carpenter, Seymour E. Harris, Dr. John Dollard, General Lucius D. Clay (retired), Elihu Root, Jr., Rowan Gaither, Albert J. Carey, James F. Pinkney, Walter Giford, Warren Weaver, Chester Barnard, Don Marquis, Dr. Fred Stephan, Sidney K. Wolf, Admiral Ben Moreell (retired), Dr. Mervin J. Kelly, James A. Perkins, Thomas W. Lamont, Junius Morgan, Edward S. Mason, and Sherman Kent. Memorandum for the Joint Chiefs of Staff from J.E. Hull, Lieutenant General, USA, Director, Weapons Systems Evaluation Group, 31 May 1950 in *America's Plans for War Against the Soviet Union, 1945-1950*, Steven T. Ross and Rosenberg, eds., (New York:Garland Publishing, 1990), [pp. xx-xxii], vol. 13: *Evaluating the Air Offensive: The WSEG 1 Study*.

⁶¹ For the lower set of assumptions, the group assumed that the Soviets employed 1,800 PVO (Soviet Fighter Defense Force) fighters and 100 night fighters. JCS 1952/11, Weapons Systems Evaluation Group Report No. 1, 10 Feb 1950, Enclosure "C," p. c-3 in Ross and Rosenberg, *Evaluating the Air Offensive*. In addition, the group assumed that the Soviets had improved only 25 per cent of their 10,000 World War II AA guns, had no unguided rockets, used the standard German KG 40 fire control director, Wurzburg radar, and time-fuzed shells. JCS 1952/11, p. 168.

jet and piston-engined aircraft.⁶² Although the report acknowledged that actual Soviet capability might not resemble either set of assumptions, no other option existed for the assessment.⁶³

Along the same lines, the Weapons Systems Evaluation Group measured SAC capabilities based on statistical analysis of World War II bomber performance and SAC training records. The report considered not only statistics for the circular error probable (CEP -- the radius within which one-half of the bombs dropped may be expected to fall), but the type of target, its distance from the aiming point, and the lethal area of the bomb against the type of structure in question. For daylight, visual bombing, the WSEG estimated a CEP between 1,000 and 1,500 feet with about ten per cent of the bombs falling outside the target area. On the other hand, the group assessed the CEP for SAC's radar bombing as 3,000 feet for "easy" targets and 5,000 feet for "difficult" targets based on the anticipated quality of the target's radar return.⁶⁴ WSEG Report No. 1 stressed the importance of bombing accuracy even with atomic weapons. The board estimated a damage assessment of 0.90 (90% of the target damaged beyond repair) for a CEP of 1,500 feet. When CEPs increased to 3,000 feet and 5,000 feet, the damage assessment dropped to 0.63 and 0.34

⁶² The higher set of assumptions added 2,200 additional planes from Soviet tactical and naval air forces to the 1,800 PVO fighters and included 300 night fighters based upon the German Me-262 jet fighter. JCS 1952/11, Enclosure "C," p. c-3 & c-15. Plus, the higher set of estimated Soviet anti-aircraft weapons included 3,500 modernized 88 mm guns, 3,500 *Taijun* rocket launchers, 8,000 conventional guns, fire control radar similar to the US SCR-584, fire control directors similar to the US M-9, and contact fuzed shells. JCS 1952/11, p. 168. In contrast, the German air defense system numbered 12,000 AA guns, 800 night fighters, and 1,500 fighters to oppose the 3,000 four-engine bombers of the US Eighth Air Force alone. JCS 1952/11, p. 166.

⁶³ JCS 1952/11, p. 158.

⁶⁴ Operating an airborne radar set was (and still is) as much of an art as a science. Certain types of buildings reflect radar energy better than others. In addition, large cities often appear as amorphous blobs with few distinguishing features. Thus, cities with distinct geographical features or offer land-water contrast, i. e. San Francisco, are "easy" targets, while those with few distinguishing features, i. e. Omaha, are "difficult." Author's personal observation; JCS 1952/11, pp. 185-188.

respectively.⁶⁵

After similar assessments of fighter versus bomber engagements, the effects of ECM upon both defenses and bombing radar, and other calculations, the WSEG determined the overall success and losses of several hypothetical air-atomic campaigns based on the current war plan OFFTACKLE. In each attack, a total force of 360 medium bombers, 30 heavy bombers, and 72 reconnaissance aircraft sought to deliver 220 atomic bombs on Soviet urban areas. Subtracting planes lost for routine maintenance and air aborts, the remaining aircraft accomplished the following.⁶⁶

<u>Type of Attack</u>	<u>Soviet Capability</u>	<u>Sorties</u>	<u>Bombs on Target</u>	<u>Strike Success %</u>
Night	Lower	871	186	84%
Night	Higher	1,039	176	80%
Day	Lower	993	185	85%
Day	Higher	1,221	153	70%

On the other hand, the bombers suffered the following casualties:

<u>Type of Attack</u>	<u>Soviet Capability</u>	<u>Sorties</u>	<u>Lost Over Enemy Territory</u>	<u>Damaged Beyond Repair</u>	<u>%Lost</u>
Night	Lower	871	33	23	12%
Night	Higher	1,039	123	25	32%

⁶⁵JCS 1952/11, p. 189.

⁶⁶The projected forces available to the USAF on May 1, 1950 included 570 medium bombers (B-29s and B-50s) and 54 heavy bombers (B-36s). However, much of this force was devoted to training, command support, and replacement. JCS 1952/11, p. 163. In addition, the WSEG used the following to determine air abort rates:

<u>AIR ABORT RATE</u>			
<u>Altitude</u>	<u>B-29</u>	<u>B-50</u>	<u>B-36</u>
20,000 ft	4 1/2%	5%	11%
25,000 ft	6%	-	-
30,000 ft	11%	6%	14%
35,000 ft	x	11%	-
40,000 ft	x	x	20%

JCS 1952/11, p. 184.

						130
Day	Lower	993	168	22	41%	
Day	Higher	1,221	222	27	55%"	

According to the Weapons Systems Evaluation Group, SAC proved capable of conducting the proposed atomic phase of the strategic air campaign proposed by OFFTACKLE. Nevertheless, the hypothetical day attacks suggested that unacceptable casualties might result even against lower Soviet air defense capability. Moreover, WSEG Report No. 1 ruled the conventional aspects of OFFTACKLE unfeasible for logistical reasons. The report cited inadequate numbers of medium bombers, overseas bases, transport aircraft, and insufficient aviation fuel stocks as reasons making the full strategic air campaign impossible.⁶⁴ The report also identified a major problem with the war plan's reconnaissance:

One of the difficult tasks in planning those raids was to incorporate reconnaissance missions into the raid pattern. The loss rates of unescorted reconnaissance planes appear to be too large to sustain such operations in daylight. Since 43 of the targets under the current plan may require visual reconnaissance, it appears that the required reconnaissance sorties can be obtained only by running the reconnaissance planes in with a massed day raid. A re-attack of the same region would therefore be required at a later time.⁶⁵

In overall terms, WSEG Report No. 1 represented a comprehensive, unbiased attempt to assess whether a strategic air campaign would work. Combined with the Harmon Report, the WSEG evaluation supported Air Force confidence in strategic bombardment, but in guarded, cautious terms. Neither the Air Force, nor the Navy were pleased by the findings. The Navy disagreed with even the limited endorsement of strategic air warfare, while the Air Force disputed the assessment of high casualties and adverse psychological effects

⁶⁴ JCS 1952/11, p. 191

⁶⁵ JCS 1952/11, pp. 158-159

⁶⁶ Ibid., p. 193.

associated with atomic bomb use. Because the reports backed neither side convincingly, President Truman found them ambiguous and inconclusive.⁷⁰ Lost amid the bureaucratic controversy, the WSEG Report emphasized the grave deficiencies of existing intelligence.⁷¹

The inadequacy of strategic intelligence challenged the accuracy of the WSEG's reasoned, yet speculative, sets of assumptions. Although the report mentioned the consequences of a German breakthrough in night fighter radar and tactics, the WSEG assumed that the Soviets were incapable of making unexpected technological advances.⁷² In addition, the report acknowledged the susceptibility of existing US bombing radar to noise jamming and it recognized that the US knew little about Soviet ECM capability, but the report assumed that the Soviets could not exploit this US weakness.⁷³ Furthermore, the WSEG never considered the Soviet development of radars or jet fighters superior to US equipment. Therefore, although the WSEG Report No. 1 represented the best assessment possible, inadequate intelligence weakened its conclusions. Without genuine knowledge of Soviet air defense capability, an accurate evaluation of US strategic air war plans was impossible.

While government officials argued over the wisdom of American defense strategy, international events changed the political context of the debate. Since World War II, the United States based its war plans on the existence of an atomic monopoly. On August 29, 1949, the Soviets shattered the assumption by exploding an atomic bomb. First detected by Air Force reconnaissance aircraft

⁷⁰ Rearden, *The Formative Years*, pp. 408-410

⁷¹ JCS 1952/11, p. 153, p. 161, & p. 165

⁷² In the winter of 1943-1944, the *Lufwaffe* combined improved SN₂ Airborne Intercept radar and innovative air-to-air tactics to inflict devastating casualties upon the RAF night bombing campaign

⁷³ JCS 1952/11 p. 162 & p. 188

flying under Project SNIFDEN, news of the Soviet atomic bomb startled the US military establishment.⁷⁴ Moreover, President Truman's announcement of the event rocked American public opinion. Previously, America's sole possession of the atomic bomb inspired confidence and permitted the overall reduction of military forces. The surprise detonation of a Soviet atomic bomb changed the situation drastically.

The Soviet atomic explosion underscored the importance of USAF aerial reconnaissance. Ironically, the Air Force Long Range Detection Program began because of the efforts of Atomic Energy Commissioner Lewis L. Strauss over the objections of the military establishment.⁷⁵ In April 1947, Strauss observed that no system existed for monitoring Soviet atomic testing. Although the military services argued that the Soviets lacked the capability to build a bomb in the near future, Strauss eventually prevailed. In June 1947, the Long Range Detection Program directed the Air Force to determine "the time and place of all large explosions which might occur anywhere in the world and to ascertain in a manner which would leave no question, whether or not they were of nuclear origin."⁷⁶

The Air Force developed techniques for the airborne collection of atomic samples during the SANDSTONE atomic tests of early 1948. Technicians mounted large boxlike cans on top of B-29s from the 373rd Reconnaissance Squadron, Very Long Range, Weather. The cans contained filters capable of

⁷⁴ Bradley and Clay, *A General's Life*, p. 513-514.

⁷⁵ Richard G. Hewlett and Francis Duncan, *A History of the Atomic Energy Commission* (University Park, Pa.: The Pennsylvania State University Press, 1969), vol. 2: *Atomic Shield 1947-1952*, pp. 130-131; Jeffrey Richelson, *American Espionage and the Soviet Target* (New York: William Morrow & Co., 1987), p. 115.

⁷⁶ Lewis L. Strauss, *Men and Decisions* (Garden City, N.Y.: Doubleday, 1962), p. 202 & p. 204; Richelson, *American Espionage and the Soviet Target*, p. 116; Hewlett and Duncan, *Atomic Shield 1947-1952*, p. 131.

detecting radioactive particles.⁷⁷ Between May 12, 1948 and September 3, 1948, the WB-29s (as the modified aircraft were designated) registered 111 Atomic Detection System Alerts which occurred when the filters showed radiation counts greater than fifty per minute. Nevertheless, analysts determined that all the alerts were due to natural causes. On September 3, 1949, a WB-29 on patrol between Japan and Alaska detected radiation levels greater than eighty-five counts a minute and additional flights produced filters with counts over a thousand counts per minute. Teams of experts from Los Alamos and the Naval Research Laboratory concluded that the samples "are consistent with the view that the origin of the fission products was the explosion of an atomic bomb whose nuclear composition was similar to the to the Alamogordo bomb and that the explosion occurred between the 26th and 29th of August at some point between the east 35th meridian and 170th meridian over the Asiatic land mass."⁷⁸

Although the detection of the Soviet atomic bomb proved the value of aerial reconnaissance, the event undermined confidence in US intelligence. As mentioned in OFFTACKLE, most intelligence assessments viewed mid-1953 as the most probable date and mid-1950 as the earliest possible date for the Soviet development of atomic weapons. The surprise Soviet breakthrough shattered illusions of Soviet technical backwardness. If the Soviets could successfully explode an atomic bomb, considered a most difficult technical challenge, how valid were estimates of Soviet electronic and aviation capabilities? The lukewarm support of strategic bombing by WSEG Report No.1 presumed no Soviet breakthroughs -- now one had occurred. How could

⁷⁷ Richelson, *American Espionage and the Soviet Target*, p. 117

⁷⁸ Robert J. Donovan, *Tumultuous Years: The Presidency of Harry S. Truman, 1949-1953* (New York, W.W. Norton, 1982), pp. 98-99; Richelson, *American Espionage and the Soviet Target*, pp. 117-118.

the United States assess the viability of its strategic air doctrine or the feasibility of its war plans? Without the technology to penetrate Soviet borders, the US lacked the means to properly assess an evolving Soviet threat.

To make matters worse, the Communist triumph in the Chinese Civil War added to the shock of the Soviet atomic bomb. Although the Truman Administration eventually realized the inept, corrupt nature of Chiang Kai-shek's Nationalist China, the President failed to prepare the American public for a Nationalist defeat. Hence, President Truman and other Democrats suffered vehement attacks from conservative Republicans for the "loss of China" and the erosion of US strength. As a result, President Truman directed a comprehensive study of US national security.

In April 1950, a select committee headed by Paul H. Nitze produced NSC 68, a fundamental reassessment of the containment policy of the United States. Although retaining the term "containment," NSC 68 shifted emphasis from long-term political and economic competition to countering an immediate military threat. A concluding paragraph summarized the rationale and recommendations of the document:

In particular, the United States now faces the contingency that within the next four or five years the Soviet Union will possess the military capability of delivering a surprise atomic attack of such weight that the United States must have substantially increased general air, ground, and sea strength, atomic capabilities, and air and civilian defenses to deter war and to provide reasonable assurance, in the event of war, that it could survive the initial blow and go on to the eventual attainment of its objectives. In turn, this contingency requires the intensification of our efforts in the fields of intelligence and research and development.⁷⁹

In contrast to the previous pronouncements of the Truman Administration, NSC 68 argued that the US economy could sustain increased defense spending and

⁷⁹ NSC 68, United States Objectives and Programs for National Security, April 14, 1950, in Etzold and Gaddis, *Containment: Documents on American Policy and Strategy*, p. 438.

tolerate short-term budget deficits. In fact, Keynesian economists observed that increased defense spending would stimulate the overall domestic economy.⁸⁰ In general, NSC 68 provided the intellectual foundation for postwar American rearmament. Increased budgets diffused the Navy-Air Force feud over the merits of strategic air bombardment. In practical terms, NSC 68 played a lesser role in the build-up of US military strength. By the time President Truman approved the revised NSC 68/2 in September 1950, American "boys" were fighting and dying in Korea.

While the National Security Council deliberated NSC 68, the Soviets removed the shroud of secrecy surrounding the Ferret program. On April 8, 1950, an unarmed Navy PB4Y Privateer patrol plane with a crew of ten men was shot down over the Baltic Sea by Soviet fighters. Three days later, Soviet Foreign Minister Andrei Y. Vishinsky handed the US Ambassador, Admiral Alan G. Kirk, the following note of protest:

. . . According to verified data, on 8 April this year at 17 hours 39 minutes, there was observed south of Libaya (Libau) a four-motored military airplane B-29 (Flying Fortress) with American identification signs which went into [the] territory of [the] Soviet Union for 21 kilometers. As [the] American airplane continued going deeper into Soviet territory, [a] flight of Soviet fighters arose from [a] nearby airdrome, demanding that [the] American airplane follow them for landing at [the] airdrome, [the] American airplane not only did not submit to this demand, but opened fire on [the] Soviet airplanes. In view [of] this, [the] leading Soviet fighter was compelled to return fire, after which [the] American airplane turned toward [the] sea and disappeared.

[The] Soviet Government states [a] resolute protest to [the] Government [of the] USA against [this] gross violation of [the] Soviet border by American military airplanes which is at [the] same time [an] unheard of violation [of] elementary standards [of] international law.⁸¹

⁸⁰ Gaddis, *Strategies of Containment*, pp. 93-94.

⁸¹ Alan G. Kirk, "Telegram: Ambassador in Soviet Union to Secretary of State, Moscow, April, 1950," in Everett Gleason and Frederick Aandahl, gen. ed., *Foreign Relations of the United States 1950*, Vol. 4: *Central and Eastern Europe; The Soviet Union*, Rogers P. Churchill, Charles S. Sampson, and William Z. Slanney, eds. (Washington, D.C.: Government Printing Office, 1980, pp. 1141-42.

In his telegram to Secretary of State Dean Acheson, Ambassador Kirk observed, "Vishinsky's manner was serious but not aggressive nor antagonistic . . . recommend publicity on our side be avoided or if unavoidable, minimized. I did not have [the] impression [that] Vishinsky was preparing [to] create [a] situation of real gravity although his manner [is] definitely serious and may mask something in propaganda line."⁸²

Following an investigation of the incident, Admiral Forrest Sherman, Chief of Naval Operations, reported that an unarmed Navy patrol plane, not a B-29 as the Soviets claimed, departed Wiesbaden, Germany, at 10:31 Greenwich Mean Time on a "properly scheduled flight pursuant to directives of the Commander in Chief, U.S. Naval Forces, Eastern Atlantic and Mediterranean, for purposes previously approved by the Chief of Naval Operations." (This rather cryptic phrase appears significant because apparently the early Ferret program was conducted without specific Presidential authorization. As a result, official sources dodged all questions concerning the purpose of the flight.) Admiral Sherman added that standing orders required US Navy aircraft to "make no approached closer than 20 miles to any shore of the USSR, its possessions or its satellites." Verifying that the aircraft was unarmed, Admiral Sherman concluded:

A relatively slow unarmed patrol plane could not have attacked a Russian fighter and the Soviet note is untrue in that regard. It is probably untrue also with respect to the location of the incident. It is not likely that competent personnel would overfly Soviet occupied Latvia, nor that Soviet fighters would break off action over land under such circumstances.⁸³

⁸² Ibid., pp. 1140-41.

⁸³ Admiral Forrest Sherman, Memorandum from Chief of Naval Operations to Secretary of the Navy, Subject: Attack on United States Aircraft by Soviet Aircraft, April 14, 1950, *FRUS 1950*, Vol. 4, p. 1142-1143.

The attack launched a wave of frenzied rhetoric by outraged politicians and vigilant newsmen. For example, the *New York Herald Tribune* announced "a proposal by the House Democratic leader, Representative John W. McCormick of Massachusetts, that the United States should sever diplomatic relations with the Soviet Union, or, perhaps, recall Ambassador Kirk." Not to be outdone, Representative Carl Vinson compared the incident to the Japanese attack on the *U.S.S. Panay* in 1937: "Here, in the same pattern, in the same manner, for the same purpose, with the same ruthlessness, with the same contempt for life, for democratic institutions, for international law, for decency -- a barbaric attack is made on an unarmed [,] defenseless American aircraft." Reminding Americans of their unpreparedness for the last war, Vinson called for increased spending for military aircraft to "maintain sufficient force to insure Russian respect."⁸⁴

Within a few weeks, probing reporters uncovered the plane's secret mission. In a *Washington Post* article, Marquis Childs revealed that "the Russians believed that the American plane was carrying a recently developed type of reconnaissance equipment. This electronic equipment makes it possible to do reconnaissance at much greater distances than has ever more been possible."⁸⁵ Columnist Drew Pearson claimed the Navy's posted list of crew members, showing the presence of electronics specialists, broadcast the patrol plane's mission to the Russians even before its take off. "They knew the plane was equipped with high-powered radar and electronics equipment that could watch amphibian maneuvers and the flight of rockets over the Russians'

⁸⁴ "McCormick Urges Break in Relations," *New York Herald Tribune*, 22 April 1950, p. 1, Democratic National Committee Library Clipping File (DNC), Foreign Affairs File, Box 154, Folder: Russo-American Incident over Baltic Area, April 1950, HSTL.

⁸⁵ "Baltic Plane Mystery," *Washington Post*, 28 April, 1950, n. p., DNC, Foreign Affairs File, Box 153, Folder: Incident of U.S. Plane Shot Down in Baltic, April 1950, HSTL.

most secret rocket-testing ground -- the Baltic."⁶⁶

In his *Washington Post* column, Walter Lippman speculated that the Soviets destroyed the Navy Privateer as a deliberate act of policy. He believed the Soviets set a trap for the patrol plane:

The known facts indicate that the Soviet intelligence had advance notice that the plane would fly a course over the Baltic Sea, that though it was known to be unarmed the Soviet intelligence believed it carried important electronic equipment, and that orders were given to the Soviet fighter command to intercept it, to capture it if possible, and failing that, to shoot it down.⁶⁷

The fact that no wreckage could be produced over Soviet territory disproved the Russian claim of violated territorial sovereignty. Lippman questioned the motives for the Soviets decorating the fighter pilots credited for the kill:

The ostentatious award of "The Order of the Red Banner" to four Soviet flying officers was plainly intended to advertise the exploit. The award is particularly significant, it seems to me, because these officers did not in fact succeed in doing what, according to M. Vishinsky, they tried to do. He says that they tried to capture the plane by making it land in Latvia. He says that they did not do that. Failing the capture of the airplane, the Soviet fighters ought to have been able to shoot it down within Soviet territory. M. Vishinsky says that they did not do that either. What then did these fighters do that entitled them to special honors and decorations?⁶⁸

Answering his question, Lippman postulated that the incident served a twofold purpose: "One, which probably failed, was to capture a plane with valuable military secrets; the other was to demonstrate to the world that the Soviet air defenses are able to repel American strategic air power." Obviously, the second objective proved more important in the eyes of the Soviet hierarchy

⁶⁶ "Washington Merry Go Round," *New York Mirror*, 9 May 1950, n. p., *Ibid.*

⁶⁷ Walter Lippman, "The Baltic Affair," *Washington Post*, 24 April 1950, n. p., DNC, Foreign Affairs File, Box 153, Folder, Incident of U.S. Plane Shot Down in Baltic, April 1950, HSTL.

⁶⁸ *Ibid.*

and resulted in the widespread publicity of the incident.

The affair lends considerable weight to the view that the Russians are intent first of all upon making their own territory invulnerable to American airpower. If they could make it invulnerable, then the Red [A]rmy would be virtually unopposed around the periphery of the Soviet Union. This Baltic incident is meant, I believe, to convince the Russian people and also the people of Europe that the Soviet Union has achieved an air defense.⁸⁹

Regardless of whether the speculation of national columnists was correct or the tirades of politicians justified, the 1950 Baltic incident thrust aerial reconnaissance into the limelight. Largely caught unaware, President Truman called for a thirty-day suspension of flights until matters could be properly assessed. The political volatility of the missions had to be weighed against the need for intelligence. As General Omar Bradley stated in a memorandum to the Secretary of Defense, "It is recognized that there is a risk of repetition of such incidents upon resumption of these flights, but it is felt that there would be more serious disadvantages occurring to the United States if the cessation of these operations were to be extended over an excessively long period."⁹⁰

The immediate impact of the 1950 Baltic incident upon US aerial reconnaissance stemmed from the review ordered by the President. On May 5, 1950, the Joint Chiefs of Staff formalized the goals and operating procedures of the Ferret missions, now called the Special Electronic Airborne Search Project (SESP). In a memorandum to the Secretary of Defense, later briefed to the President, General Bradley outlined the program. The aim of the SESP was to obtain "the maximum amount of intelligence concerning foreign electronic

⁸⁹ Ibid.

⁹⁰ General Omar Bradley, Memorandum for the Secretary of Defense, Subject: Special Airborne Search Operations (SESP), 5 May 1950, President's Secretary's File, General File: Bradley, Omar N., HSTL.

developments as a safeguard to national defense."⁹¹ The Joint Chiefs of Staff scheduled the missions to be flown along the borders of the Soviet Union to locate and analyze enemy air defenses. These flights would be conducted under strict operating procedures which included:

- Flights will not be made closer than twenty miles to the USSR or USSR-or (sic) satellite-controlled territory.
- Flights will not deviate from or alter planned courses for other than reasons of safety.
- Aircraft engaged in these operations over routes normally flown by unarmed transport-type aircraft, i. e., the land masses of the Allied Occupied Zones and the Berlin and Vienna corridors, will continue to operate with or without armament. [The President scribbled "which?" on the copy forwarded to him. A later memo explained that the statement meant to "permit operation of either armed or unarmed aircraft dependent upon whether the armed or unarmed type is available at the particular time."]
- Aircraft engaged in these operations over all other routes adjacent to the USSR or to USSR-or satellite-controlled territory will be armed and instructed to shoot in self-defense. ["good sense, it seems to me. H.S.T"]⁹²

President Truman's approval of the Special Electronic Search Program proved to be a landmark in the history of aerial reconnaissance. No longer would military considerations alone determine Ferret operations. Now the potential political impact played a major role. Reconnaissance activities received scrutiny from the office of the President as well as the military services. For the most part, fears of Soviet atomic potential and expanding military capability overpowered reservations of possible diplomatic crises. As the Baltic

⁹¹ ibid.

⁹² Although established as the Special Electronic Airborne Search Project, the reconnaissance program shortly became known as the Special Electronic Search Project. Ground sites and naval vessels augmented the effort. Bradley, SESP Memorandum, 5 May 1950, HSTL. Louis Johnson, Memorandum to the President, Subject: Special Electronic Search Operations (SESP), 24 May 1950, President's Secretary's File, General File: Bradley, Omar N., HSTL.

incident of 1950 showed, American efforts to gather intelligence risked reprisal from the Soviet Union that, in turn, captured headlines and aroused public indignation. The average American cared little about electronic intelligence or Ferret operations; but, apparently the "Commies murdered ten American boys on an unarmed plane." The death of the Navy fliers confirmed the arguments of those advocating vigilance in the Cold War. Thus, Truman's approval of the formal guidelines for aerial reconnaissance not only established a framework for operations to be conducted, but foreshadowed a decade of aerial confrontation.

By mid-1950, international events changed the political, economic, and strategic assumptions which formed the initial US response to the Cold War. From the end of the Berlin Airlift until the explosion of the Soviet atomic bomb, fiscal constraints upon military spending influenced strategy and sparked bitter interservice disputes. Although overshadowed by the spectacle of Congressional hearings and impassioned testimony during the "Revolt of the Admirals," the Navy identified the intelligence weakness of current US war planning. Acknowledged by the dispassionate findings of the Harmon Report and WSEG Report No. 1, Joint Outline Emergency War Plan OFFTACKLE and its predecessors suffered from an inability to assess Soviet targets and air defenses. Despite Air Force attempts to upgrade reconnaissance capabilities, technological limits denied war planners the information needed. Until solutions to the reconnaissance dilemma were found, US plans for strategic air war rested primarily upon unproven assumptions and speculation. With this in mind, the shock caused by the Soviet atomic bomb emphasized the danger of false assumptions.

CHAPTER V

THE TEST: STRATEGIC RECONNAISSANCE IN KOREA, 1950-1953

An outstanding fact of the Korean war was the number of old lessons that had to be relearned. . . . It appears that these lessons were either forgotten or never were documented, -- or if documented, were never disseminated.¹

O. P. Weyland

The sudden North Korean attack on the Republic of Korea on June 25, 1950, challenged the resolve, doctrine, and capabilities of the United States. The war's outbreak appeared to validate the conclusions of NSC 68 and posed a test to "containment." Yet, more than a threat to the intellectual basis of American foreign policy, fighting in Korea tested the capabilities of the United States Air Force. For air planners, the skies of Korea replaced the statistical formulas of the Weapons Systems Evaluation Group. The realities of combat provided a test of strategic air war and, in particular, for aerial reconnaissance. By the end of the war, aerial reconnaissance proved invaluable; however, enemy air defenses rendered existing strategic reconnaissance aircraft obsolete.

The specter of global war formed the strategic context behind events in Korea. Like the Berlin Crisis, President Truman and most Allied leaders worried about escalation and a general war. In July 1950, rapid North Korean gains

¹ Cited in Robert F. Futrell, *The United States Air Force in Korea*, Revised ed. (Washington, D.C.: Office of Air Force History, Government Printing Office, 1983), p. vii.

inspired joint strategic talks between the United States and the United Kingdom. Headed by General Omar N. Bradley and Ambassador Philip C. Jessup on the American side and Lord Arthur Tedder and Sir Oliver Francis on the British, Allied delegations agreed to localize the Korean conflict as much as possible. They sought to limit the involvement of troops on the Asian landmass in light of the potential threat to Europe. Consequently, the American and British leaders decided to increase military strength, to establish joint planning staffs, and to study further options in the event of Communist Chinese intervention. However, in one critical area, the two sides disagreed. The US representatives vehemently rejected a British intelligence study of Soviet military capability. The British believed that the Soviets would not be prepared to engage in general war before 1955. On the contrary, the Americans stressed their estimate that the Russians would be prepared by 1952, or earlier, and before that time, the Russians would attempt to "cause maximum difficulties short of general war."² Throughout the conflict, American policy makers worried that the North Korean onslaught might simply be a diversionary tactic, an attempt to draw US attention away from a full-scale Soviet invasion of Europe.³

The surprise achieved by North Korean troops revealed the neglect of aerial reconnaissance in the Far East Air Forces. During the turmoil of the war's early months, United Nations forces suffered from shortages of reconnaissance aircraft, intelligence personnel, and maps. At the beginning of the war, FEAF reconnaissance included only eighteen RF-80As of the 8th Tactical Reconnaissance Squadron, four RB-29s and one B-29 of the 31st Strategic

Reconnaissance Squadron, and two RB-17s and three RC-45s of the 6204th

² Summary of U.S./U.K. Discussions on Present World Situation, 20-24 July 1950.

Washington, D. C., p. 8, President's Secretary's File, General File: Joint Chiefs of Staff, Harry S. Truman Library, Independence, Missouri (hereafter abbreviated HSTL).

³ Gaddis, *Strategies of Containment*, p. 114.

Photo Mapping Flight. Of the RB-29s, only two were photo reconnaissance planes.⁴ In addition, because of budget limits, reduced flying training barely allowed air crews to maintain minimum proficiency. Equally important, the Far East Air Forces lacked adequate intelligence personnel. Within a week of the war's outbreak, the number of personnel assigned to the FEAF intelligence office doubled, but these men possessed no intelligence experience.

Shortages of qualified intelligence personnel, especially photo interpreters, made continuous surveillance of enemy troop movements, concentrations, and airfields impossible.⁵ To make matters worse, FEAF air planners discovered that previous stocks of aeronautical charts for Korea had been declared obsolete and destroyed before the war. An Air Force-wide search uncovered only twenty-five remaining copies that were reproduced.⁶ In summary, a later evaluation reported: "It is the old story of failure, in time of peace, to maintain within the units intelligence personnel sufficient in numbers and in training to serve the needs of those units should they be thrown suddenly into combat operations."⁷

Despite its initial flaws, FEAF aerial reconnaissance exploited the lack of enemy air opposition to provide vital tactical reconnaissance. Photographs from RF-80s and RB-29s quickly proved the most reliable source of battlefield intelligence. Photo intelligence allowed field commanders to plan operations, track their progress, and assess results.⁸ In September 1950, the two weary

⁴ Historical Office, Far East Air Forces, History of the Far East Air Forces, 25 June -- 31 December 1950, p. 158, File number: K-720.01, v. 1, 25 Jun-31 Dec 1950, USAFHRC.

⁵ Ibid., p. 157.

⁶ Ironically, in an effort to save time, the Air Force contracted Japanese companies to print the charts. Ibid., p. 153 & p. 158

⁷ Quoted in Robert F. Futrell, "A Case Study: USAF Intelligence in the Korean War," Paper Delivered at the Thirteenth Military History Symposium, United States Air Force Academy, 12-14 October 1988, p. 12.

⁸ "FEAF Reconnaissance in the Korea Conflict," pp. 9-10, in FEAF Report on Korea, File number: K-720.04D, 25 Jun 1950 - 27 Jul 1953, USAFHRC.

RB-17s of the 6204th Photo Mapping Flight began mapping North Korea. Later augmented by RB-29s of the 31st SRS, the planes provided over 12,000 miles of photo-mapping coverage.³ In an effort to ascertain the enemy's Air Order of Battle (AOB), FEAF reconnaissance flights surveyed Manchurian airfields using oblique photography. Nevertheless, President Truman's worries over the prospect of general war prevented overflight of Soviet or Chinese territory. In keeping with the President's wishes, JCS memorandum 2150/5 established the following rules for aerial reconnaissance:

In order to establish the fact of support to the North Koreans by the USSR or the Chinese Communists, you are authorized to conduct aerial reconnaissance over all Korean territory, including Korean coastal waters, up to the Yalu River on the west coast and up to but short of the Korean-Soviet international boundary on the east coast. Such aerial reconnaissance operations will be conducted from as far south of the frontiers of Manchuria or the Soviet Union as practicable and in no case will these frontiers be overflown.⁴

Thus, political considerations limited FEAF reconnaissance efforts which might have detected Chinese infiltration of units across the Yalu River.

Even without political restrictions, FEAF aerial reconnaissance lacked the ability to provide continuous coverage of the Sino-Korean border in the fall of 1950. Since the Communist Chinese armies moved primarily at night and employed excellent camouflage, FEAF's periodic daylight photo sorties showed no troop movements. In a sense, the strategic surprise achieved by the Chinese Communists emphasized the danger of inadequate aerial reconnaissance. The reports of negative activity reinforced the false assumptions of the Far East Command. At the core of the problem, both the Far East Command and the JCS believed that Moscow controlled Chinese actions. Convinced that the

³ History of the Far East Air Forces, 25 June--31 December 1950, p. 176.

⁴ JCS 2150/9, August 5, 1950, Delimitation of Air Operations Along the North Korean Border, Record Group 218, Modern Military Branch, NA.

Soviets would not allow a solo Chinese effort, US military leaders focused upon the Soviet threat.¹¹ In other words, inappropriate information fed faulty analysis, which in turn supported flawed preconceptions. US strategic reconnaissance missed Communist China's preparations for intervention for technical as well as political reasons. Because of this technical failure, military leaders discounted diplomatic signals of impending Chinese intervention.

Outside the Korean peninsula, the USAF renewed efforts to watch the Soviets. On June 6, 1950, the President granted permission for the Air Force to resume ECM flights in the Baltic. The flights, scheduled twice a week, followed the guidelines established by the Special Electronic Search Program (SESP). With the outbreak of hostilities in Korea, George W. Perkins, Assistant Secretary of State, called for a two-week suspension of the missions. He believed another Baltic incident might jeopardize the strong American position in the UN and threaten efforts to localize the conflict in Korea. Reluctantly, the Joint Chiefs approved the suspension, recognizing the impact of aerial reconnaissance on foreign policy. Once the UN decided to intervene on the behalf of South Korea, the State Department relented. On July 22, 1950, General Bradley ordered the Air Force to resume Baltic ECM flights.¹²

European activities dramatized the expansion of strategic aerial reconnaissance in 1950. The new 55th Strategic Reconnaissance Wing supplied detachments of three RB-50 Ferrets and two KB-29 tankers for the Special Electronic Search Program. Based at RAF Lakenheath and RAF Mildenhall air bases, these Ferret aircraft flew electronic surveillance along

¹¹ Bradley and Blair, *A General's Life*, p. 557.

¹² Omar N. Bradley, Memorandum for the Secretary of Defense, Subject: Special Electronic Airborne Search Operations, 22 July 1950, President's Secretary's File, General File: Bradley, Omar N., HSTL; See also Reconnaissance notebooks compiled by Dr. John Leland, Office of History, Headquarters SAC, Offutt AFB, Omaha, Nebraska.

Soviet borders.¹³ In addition, by January 1951, SAC reconnaissance aircraft began project ROUNDOUT which aimed to photograph all potential targets in Western Europe. Since US war plans assumed the rapid Soviet conquest of the continent, SAC required target folders for strikes designed to "retard" the Soviet advance. As a result, up to five RB-29s photographed sites in Germany, Austria, France, the Netherlands, Belgium, and Italy.¹⁴ By September 1952, slow progress caused SAC to send RB-36 detachments to RAF Fairford. The huge aircraft flew mapping sorties over Western Europe, but were restricted from flying with 200 miles of Soviet-controlled territory.¹⁵

Adding to the expanded scope of SAC operations, the creation of the 55th Strategic Reconnaissance Wing (SRW) increased the size of the US aerial reconnaissance program. The manning of the "Fighting Fifty-fifth" on November 1, 1950 provided an organization solely dedicated to strategic reconnaissance.¹⁶ Initially based at Ramey AFB, Puerto Rico, the three reconnaissance squadrons of the 55th represented a diverse assortment of aircraft and missions. The fourteen RB-50Es of the 38th SRS, Photo, provided aerial photography, visual observation, radar scope photography, and weather

¹³ Historical Division, OI, 7th Air Division, "SAC Operations in the United Kingdom, 1948-1956," p. 27, File number: K-DIV-7-HI, 1948-1956, USAFHRC.

¹⁴ In addition, ROUNDOUT included targets in Spain, Portugal, Sweden, Denmark, and Switzerland on a lower priority. "SAC Operations in the United Kingdom," p. 26

¹⁵ In his book, *American Espionage and the Soviet Threat*, Jeffrey Richelson claims RB-36s flew long-range reconnaissance missions that penetrated Soviet airspace. I have found no documentary evidence for this claim. Furthermore, since penetration flights run counter to President Truman's fears of war caused by unintentional provocation of the Soviets, I find it hard to believe the President would approve such missions. In addition, General LeMay consistently resisted efforts to permit newer models of SAC aircraft (B-50s, B-36s, and B-47s) to operate in areas where their performance characteristics might be compromised. He did not want the Soviets to learn the strengths and weaknesses of SAC aircraft. Richelson, *American Espionage and the Soviet Threat*, p. 112 and "SAC Operations in the United Kingdom," p. 26.

¹⁶ History of the 55th Strategic Reconnaissance Wing, (M), Forbes Air Force Base, Kansas, 1 Feb 53-28 Feb 53, prepared by 2nd Lt. David Hosley and SSgt Wesley T. Lassetter, p. 6, File number KG-WG-55-HI, Feb 53, USAFHRC.

observations.¹⁷ The 338th Strategic Reconnaissance Squadron, Photo-Mapping, added the ability to accomplish electronic geodetic mapping with its fifteen RB-50F aircraft. Geodetic mapping utilized the SHORAN navigation system to produce highly accurate aeronautical charts. The information provided also served as the basis for SHORAN bombardment, which permitted bombers to strike without seeing their targets.¹⁸ Rounding out the wing, the fourteen RB-50Gs of the 343rd SRS, Electronics, provided "air intelligence of enemy electronic missions throughout the full range of the usable spectrum . . . and night aerial photography."¹⁹ In sum, the 55th SRW formed an expanded, permanent organizational structure for Air Force strategic reconnaissance.

Shortly after the Chinese intervention of early November 1950, new equipment boosted the capabilities of FEAF aerial reconnaissance. On November 16, 1950, the 91st Strategic Reconnaissance Squadron replaced the 31st SRS as the primary "heavy" reconnaissance unit in the Pacific.²⁰ The 91st consisted of nine RB-29 aircraft, including three equipped with SHORAN and two modified for Ferret missions. In addition, SAC provided four RB-45 jet photo

¹⁷ History of the 55th SRW, September 1951, p. 4, USAFHRC; Gordon Swanborough and Peter M. Bowers, *United States Military Aircraft Since 1908*, (London: Putnam, 1971), p. 105.

¹⁸ "In SHORAN controlled aerial photography, the cameras automatically take pictures every two, five, or 10 seconds. The system utilized electronic ground stations and a special receiver in the RB-50 . . . The ground stations are accurately positioned in relation to the area that is desired to photograph. The principle involved in this operation is a measurement of the time it takes electronic signals, simultaneously transmitted from two ground stations, to arrive at the RB-50's receiver. The time differential of arrival of these signals at the airborne receiver, can be measured and recorded as the geographical position of the RB-50, at any particular instant. In this manner, spaced photo flight lines over an area of interest can be very accurately flown because the plane has a constant true position." Harry Lever, "Strat Recon + Technical Aids + *Pinpoint Bombing, Flying, April 1952, cited in Bailey, "We See All," p. 30; History of the 55th SRW, September 1951, p. 4, USAFHRC; Futrell, *The United States Air Force in Korea*, p. 105.

¹⁹ In addition, crews from the 343rd SRS augmented the Ferret flights staged by the 91st SRS in Korea. History of the 55th SRW, February 1951, p. 4, USAFHRC.

²⁰ Ibid., p. 551

reconnaissance aircraft.²¹ Although the RB-45 offered only moderate speed and altitude performance, it represented a major improvement over the prop-driven RB-29s. By August 1951, the 91st added "Detachment 3" which consisted of three advanced RB-50G electronic reconnaissance aircraft on rotation from SAC's 343rd SRS. Each aircraft employed a crew of sixteen, including eight "Ravens" and featured an array of the most sophisticated ELINT equipment available.²²

The swift expansion in the size and scope of strategic aerial reconnaissance following Chinese intervention testified to US fears of global war. Chairman of the Joint Chiefs of Staff, General Omar N. Bradley expressed the mood succinctly, "We viewed the possibility of Chinese intervention as we did the possibility of Soviet intervention in North Korea: a probable signal that the Russians were moving toward global war."²³ Following this line of thought, the Joint Chiefs of Staff proposed a list of recommendations to the Secretary of Defense in the event of various Korean developments. One particularly ominous proposal stated:

If the USSR commits units of Soviet "volunteers" sufficient to be critical to the safety of the United Nations forces, United Nations forces should be withdrawn. The United States should then mobilize for general war.²⁴

Therefore, the Chinese intervention in Korea created a crisis atmosphere in US strategic planning. Military leaders viewed the conflict as a prelude to a general war that demanded increased strategic intelligence and prompted a review of existing war plans.

²¹ "91st Strategic Reconnaissance Squadron (M) Photo," in *History of the Fifth Air Force, January - July 1953, Vol. 2: Supporting Documents*, File number: K-713.01-38, v.2, Jan - 27 Jul 1953, USAFHRC.

²² Ibid & Bailey, "We See All," p. 21.

²³ Bradley and Blair, *A General's Life*, p. 564.

²⁴ Omar N. Bradley, Memorandum for the Secretary of Defense, Subject: Military Action in Korea, 5 April 1951, President's Secretary's File, General File: Joint Chiefs of Staff, HSTL.

In December 1950, General Hoyt S. Vandenberg, Air Force Chief of Staff, asked Bernard Brodie, noted author on atomic strategy, to inspect and comment on the current JCS target list. This list represented the work of the Air Intelligence Production Division (later, the Air Targets Division) of the Air Force Directorate of Intelligence and formed the basis of SAC's operational plans. Dr. Brodie strongly criticized the air planners' failure to calculate the overall impact of the strategic air offensive. Additionally, his review revealed significant intelligence gaps. For example, the Air Staff did not know where all the major Soviet power plants were located. Without this knowledge, the total damage inflicted upon Soviet industry could not be calculated. In other words, no calculated strategy for destroying the Soviet ability to wage war existed. Apparently, the planners simply expected the Soviet Union to collapse following an atomic attack.²⁵

Ironically, Lieutenant General Curtis E. LeMay, Commander-in-Chief of SAC, attacked the target list from another angle. At a high-level meeting on January 22, 1951, he stressed that current planning placed unrealistic demands on his air crews. Too many targets required visual, pre-strike reconnaissance and isolated, unfamiliar target complexes would be difficult to locate by radar, especially in periods of bad weather. As a result, General LeMay argued, "We should concentrate on industry itself which is located in urban areas," so that even if a bomb missed, "a bonus will be derived from the use of the bomb."²⁶

As Chinese troops routed UN forces during November and December 1950, US strategic reconnaissance prepared for war against the People's Republic of China. In response to a request from Headquarters, United States

²⁵ Rosenberg, "The Origins of Overkill," p. 128

²⁶ Entry, General LeMay's Diary, 23 January 1951. Cited in Rosenberg, "The Origins of Overkill," p. 128.

Air Force, FEAF intelligence assembled existing target information. By December, researchers compiled a list of 221 targets in Indochina, Burma, Thailand, and China in addition to those already gathered for Korea and Manchuria.²⁷ Reconnaissance units expanded coverage of Southeast Asia as the Air Force and Navy coordinated efforts. The 91st SRS operated SESPs sorties from Yokota Air Base, Japan and Kadena Air Base, Okinawa to explore enemy defenses north of Shanghai. On the other hand, the Navy flew P4M-1Q Ferret aircraft from Sangley Point, Republic of the Philippines for targets in South China.²⁸

In addition to Ferret missions, Air Force strategic reconnaissance gathered radar scope photography of Chinese and Soviet targets. In July 1951, FEAF reconnaissance reported progress in developing aids to enable a radar bombardier to identify and bomb unfamiliar targets. Target folders included two new types of charts: the Target Complex Radar Analysis Chart (TCRAC) featured a scale line drawing of the target area showing the height and construction material of installations and the terrain features which would appear on a radar scope and the Radar Approach Chart (RAC) displayed a series of radar scope photographs prepared on selected approach headings for significant target areas.²⁹ At least three radar scope photographic missions were flown against Manchurian and Chinese targets in June and July 1951, but

²⁷ History of the Far East Air Forces, 25 June - 31 December 1950, p. 213.

²⁸ Letter, L. D. McCormick, Acting Chief of Naval Operations to Commander in Chief, U.S. Pacific Fleet, Subj: Assignment of P4M-1Q aircraft to Special Electronic Search Project (SESP) in the Pacific, 26 June 1951, File: Command File Post 1 Jan 46, Operational Archives, Naval Historical Center, Washington Navy Yard, Washington, D. C. (NHC).

²⁹ Historical Office, Far East Air Forces, *History of the Far East Air Forces, 1 June 1951-31 December 1951*, File number: K-720.01, v.1, 1 Jul-31 Dec 1951, USAFHRC.

declassified details are sketchy.³⁰

Navy participation in SESP projects in Southeast Asia stemmed from President Truman's decision to move the Seventh Fleet to the Formosa Strait on July 10, 1950. Originally, Navy reconnaissance efforts focused upon a potential Communist Chinese invasion of the Nationalist stronghold on Formosa (Taiwan).³¹ Eventually, both Navy and Air Force reconnaissance concentrated on providing data for strategic bombing targets. For example, SESP efforts focused on twelve special targets selected on the assumption that the geographical restrictions would be lifted for UN forces.³² Significantly, the fighting in Korea quelled the Air Force-Navy feuding over roles and missions. Unlike 1949, the services proved cooperative as budget woes eased and a shooting war demanded effective interservice cooperation.

Coinciding with Chinese intervention in Korea, the introduction of Soviet-built MiG-15 jet fighters threatened FEAf operations. The superior speed, acceleration, climb rate, and ceiling of the Soviet fighter shocked Allied air forces. In most air-to-air engagements, the greater experience and better training of American pilots prevailed; however, the MiG's 660 mph top speed

³⁰ A series of telegrams in the LeMay papers of the Library of Congress describe FEAf Bomber Command efforts to obtain radar scope photography. Two targets were photographed on June 5, 1951 and two more on July 8, 1951. Seven others were photographed on unspecified dates. Although the telegrams are declassified, the code names for the targets remain restricted. As a result, a determination of the target location and whether overflight of Soviet or Chinese territory occurred cannot be made at this time. Letter, Winton R. Close, Colonel, USAF to Major General T. S. Power, Headquarters Strategic Air Command, 6 June 1951, File number: B-11651, Box B-198, LeMay Papers, LOC; Telegram, CG FEAf BMR COMD JAPAN to CG SAC OFFUTT AFB OMAHA NEB, 8 July 1951, File number: 11931, Box B-198, LeMay Papers, LOC; Telegram, CG SAC/XRAY/ TOKYO JAPAN to CG SAC OFFUTT AFB OMAHA NEB, 9 [June 1951], File number: B-11929, Box B-198, LeMay Papers, LOC.

³¹ Commander in Chief, U.S. Pacific Fleet, Korean War, U.S. Pacific Fleet Operations, Third Evaluation Report 1 May - 31 December 1951, pp. 7-5 -- 7-6, Operational Archives, NHC.

³² Unfortunately, the specific target list remains classified. This reveals a research problem with this topic. In this case, most command histories were written at the "secret" level and did not include "top secret" material. Before 1950, many top secret annexes and other documents have been declassified, but most top secret documents related to intelligence remain classified after 1950. *History of the Far East Air Forces, 25 June- 31 December 1950*, p. 213.

outperformed all US fighters, except arguably the North American F-86 Sabre. Nevertheless, the MiG-15 totally outclassed the lumbering RB-29s and RB-50s employed for strategic reconnaissance. Initially, Communist pilots hesitated to attack FEAF aircraft, but this changed during spring 1951.³³ For example, on April 12, 1951, North Korean air defenses mustered over a hundred MiGs to attack forty-eight B-29s near Sinuiju and downed three bombers. By mid-1951, the North Korean air defense system efficiently integrated early warning, GCI, and gun-laying radars, anti-aircraft artillery, and jet fighters. Perhaps the most devastating raid occurred on October 23, 1951, when a swarm of over 50 MiGs mauled a force of nine B-29s. The unescorted formation lost three B-29s shot down and five heavily damaged. This attack resulted in the end of daylight missions for FEAF Bomber Command.³⁴

MiG-15s coupled with effective radar severely limited the activities of FEAF strategic reconnaissance aircraft. By June 1951, FEAF Bomber Command restricted the slow RB-29s against operating in northwestern Korea without fighter escort.³⁵ Eventually, enemy fighters denied "MiG Alley" to RB-29 daylight photography. Consequently, FEAF relied upon the jet reconnaissance aircraft of the 67th Tactical Fighter Wing, but even these aircraft were hard pressed. By mid-1952, a flight of two RF-80s required an escort of forty F-86 fighters.³⁶ As a result, the 91st SRS shifted to night operations. In order to provide Bomb Damage Assessment (BDA), scheduled two to four hours after a strike, the RB-29s used K-37 or K-19 cameras and M-120 flash bombs to

³³ Historical Division, Fifth Air Force, *History of the Fifth Air Force 1 January 1952-30 June 1952*, p. 151, File number K730.01, v. 1, 1 Jan - 30 Jun 1952, USAFHRC.

³⁴ Daniel T. Kuehl, Lieutenant Colonel, USAF, "Electronic Warfare and USAF B-29 Operations in the Korean War," Paper delivered to 23rd Annual Northern Great Plains History Conference, Eveleth, Minnesota, September 23, 1988, p. 3.

³⁵ Futrell, *The United States Air Force in Korea*, p. 548.

³⁶ "FEAF Reconnaissance in the Korean Conflict," in FEAF Report on Korea, File number: K-720.04D, 25 Jun 1950 - 27 Jul 1953, USAFHRC.

photograph from 22,000 to 26,000 feet. Unfortunately, technical problems plagued the night photography of the 91st SRS. Too often, aircraft vibration blurred the photos or flash bombs failed to illuminate the desired targets. Even when the equipment worked, the scale of photography proved too small for proper BDA and of little use for general surveillance.³⁷

A comparison of the missions flown in March 1951 and August 1951 illustrates the change in focus for FEAF strategic reconnaissance. Missions 178 and 179 flown by the 91st SRS showed efforts to study the air defenses of North Korea. (Figures 5 and 6) Like other Ferret missions, the RB-50 sorties identified probable locations of enemy radars. In addition, Ravens analyzed enemy radar signals by using a Warrick Hi-speed 35 mm camera to photograph the radar's signal pulse as it appeared on the aircraft's Dumont oscilloscope. At the same time, the radar observers attempted to record the "tone" of the signal on an ANQ-1 wire recorder.³⁸ Upon the mission's return to base, analysts used the information for setting the frequency of radar jamming equipment. The remaining March sorties explored air defenses along Communist China's coast. (Figures 7 and 8) American war planners sought as much information as possible in an effort to fill intelligence gaps following China's incursion.³⁹

The missions of the 91st SRS in August 1951 demonstrated the expansion and variety of strategic reconnaissance. Adding to the ECM missions flown by RB-50Gs, the 91st SRS conducted special photo reconnaissance sorties. These flights attempted to photograph certain "hyper-

³⁷ {Historical Division, Far East Air Forces}, *History of the Far East Air Forces Bomber Command, January-July 1953*, vol. 1, pp. 47-48, File number: K713.01, Jan - Jul 1953, v. 1, USAFHRC.

³⁸ History of the 91st Strategic Reconnaissance Squadron, Medium, Photo, Yokota Air Force Base, Japan, 1 April through 30 April 1953, Prepared by 1st Lt. John Hammerer, Vol. 2, March 1951, p. 4, File number: K-SQ-RCN-91-HI, Apr 1953, USAFHRC.

³⁹ History of the 91st SRS, Vol. 2, March 1951, USAFHRC.

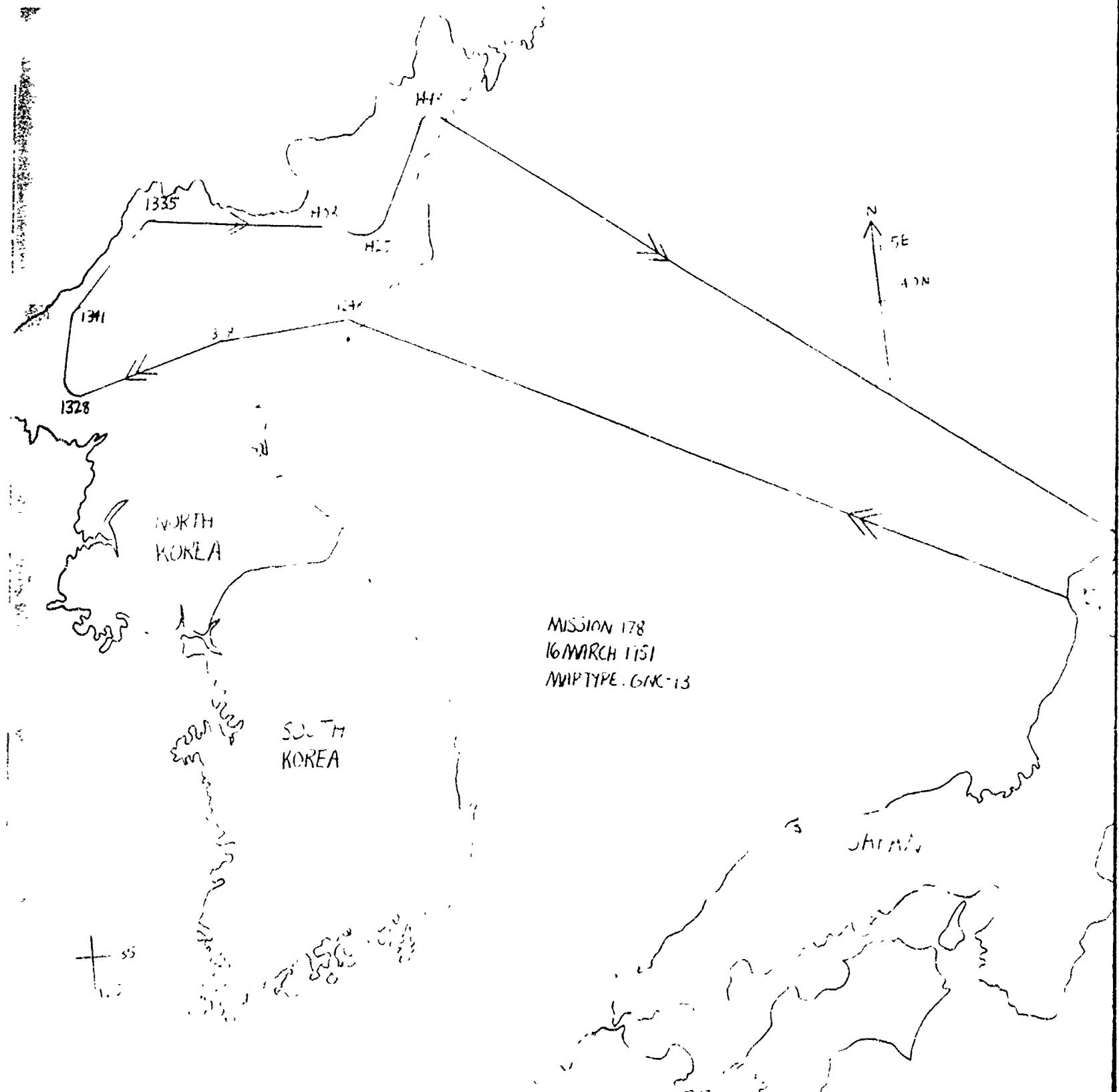


FIGURE 5. Mission 178.

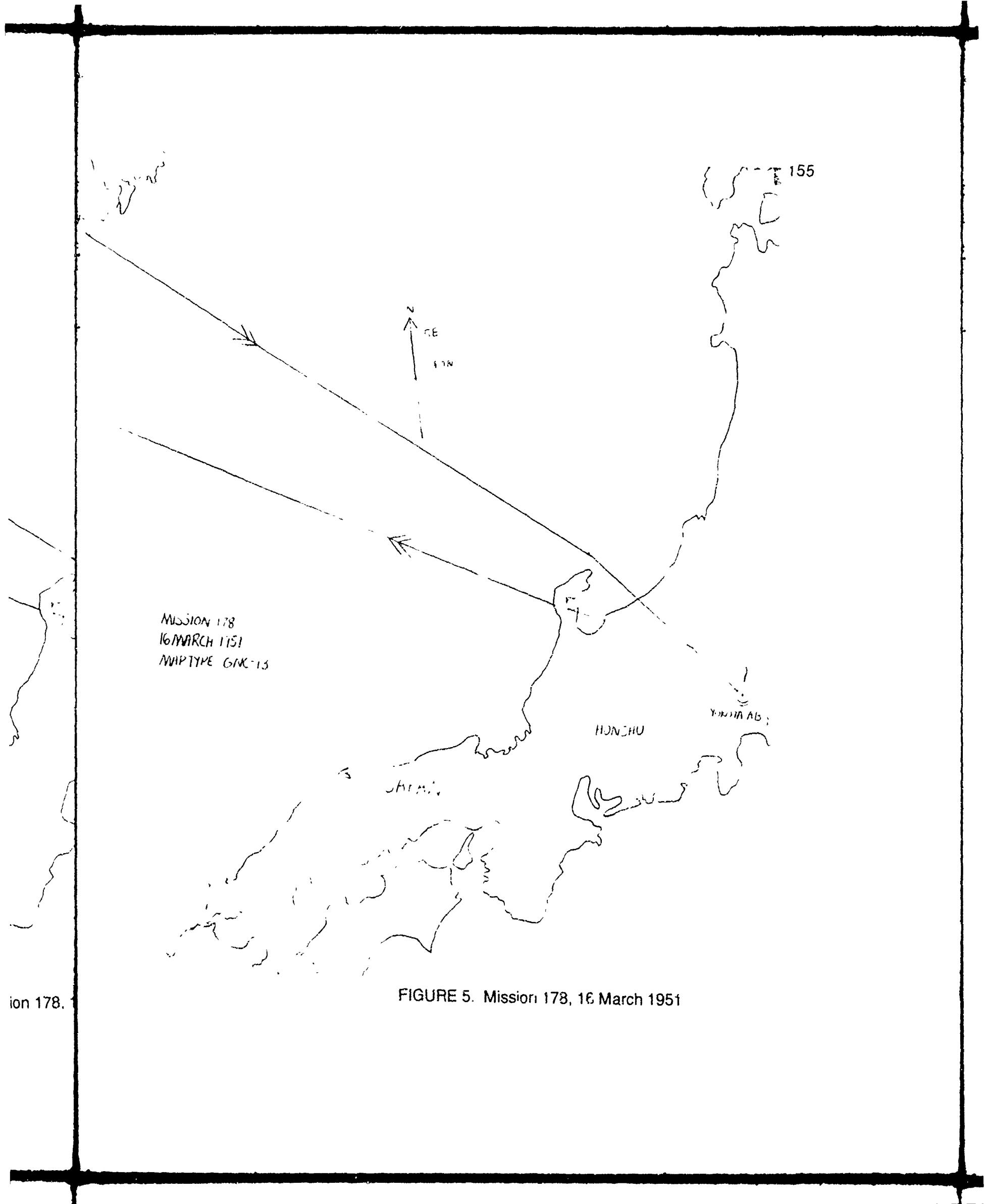


FIGURE 5. Mission 178, 16 March 1951

Mission 178.

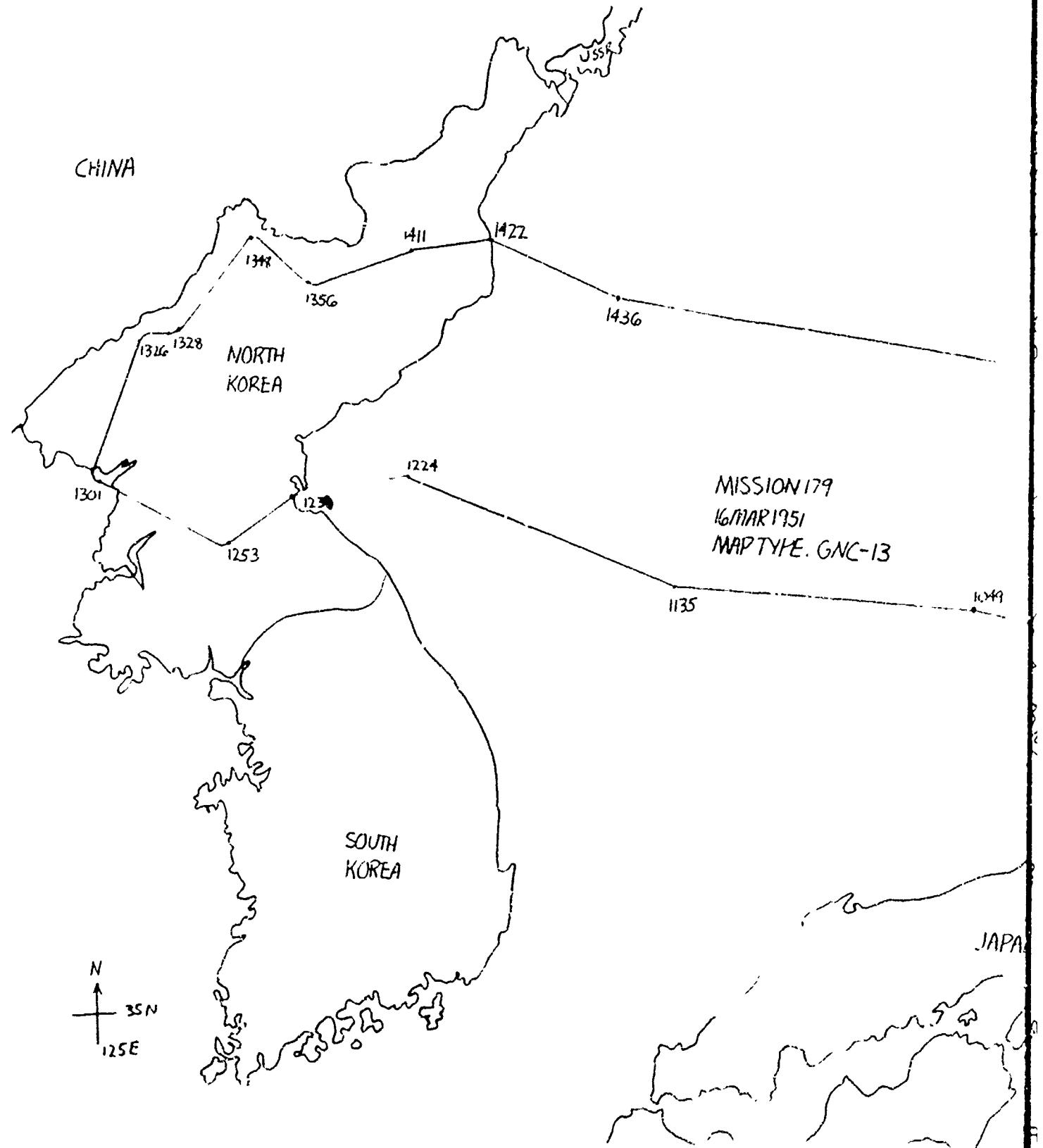
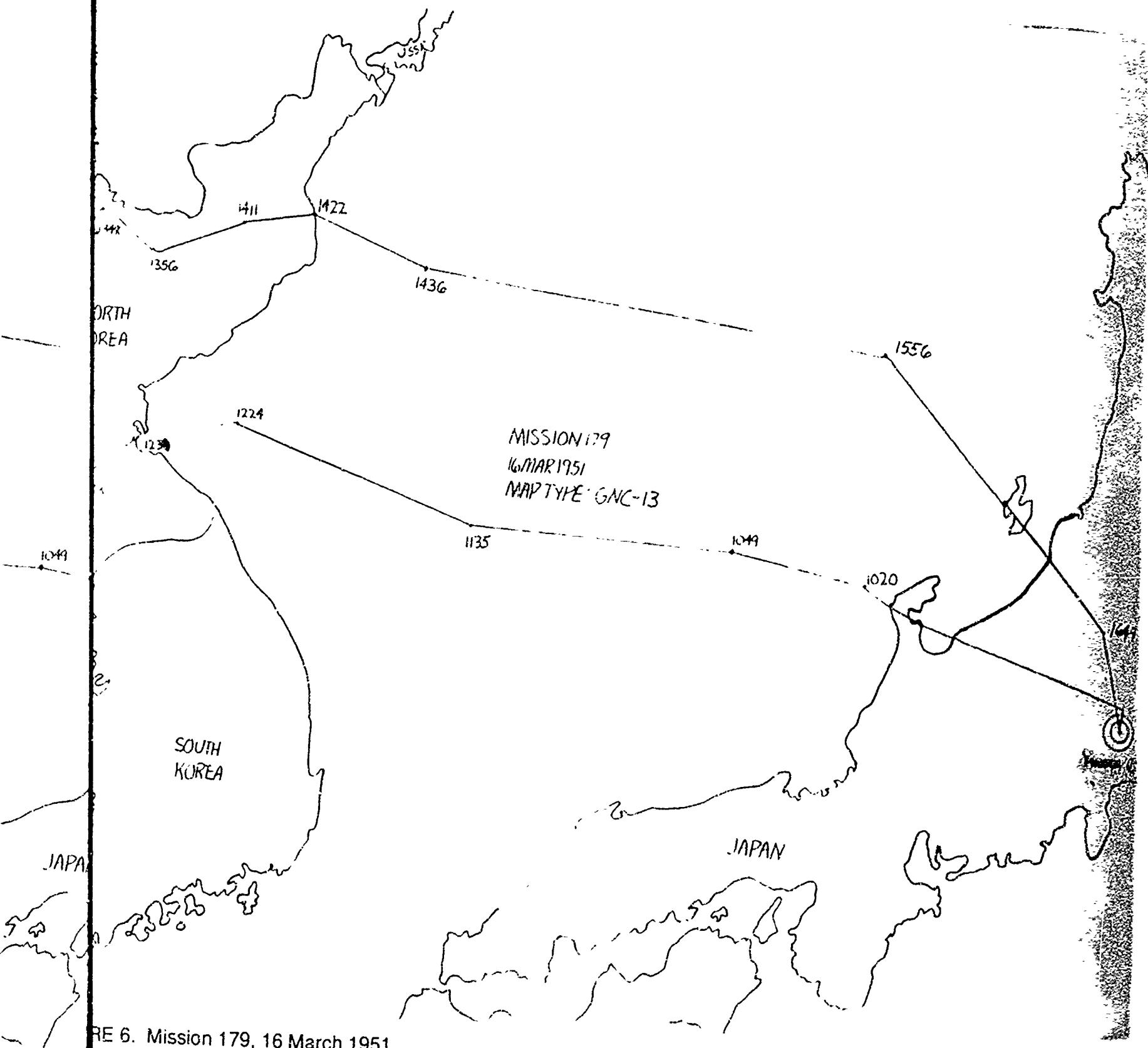


FIGURE 6. Mission 179, 16 March 1951



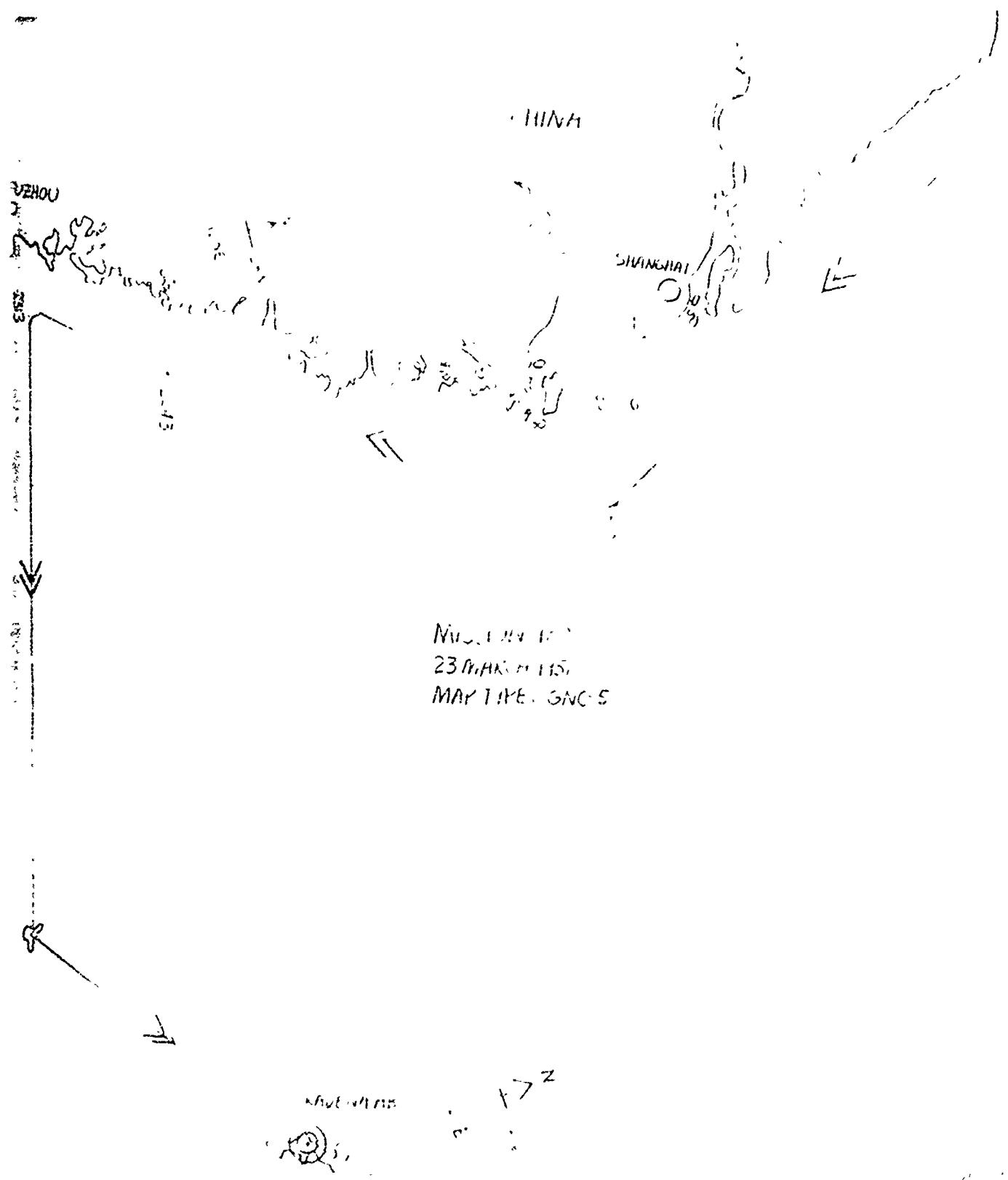
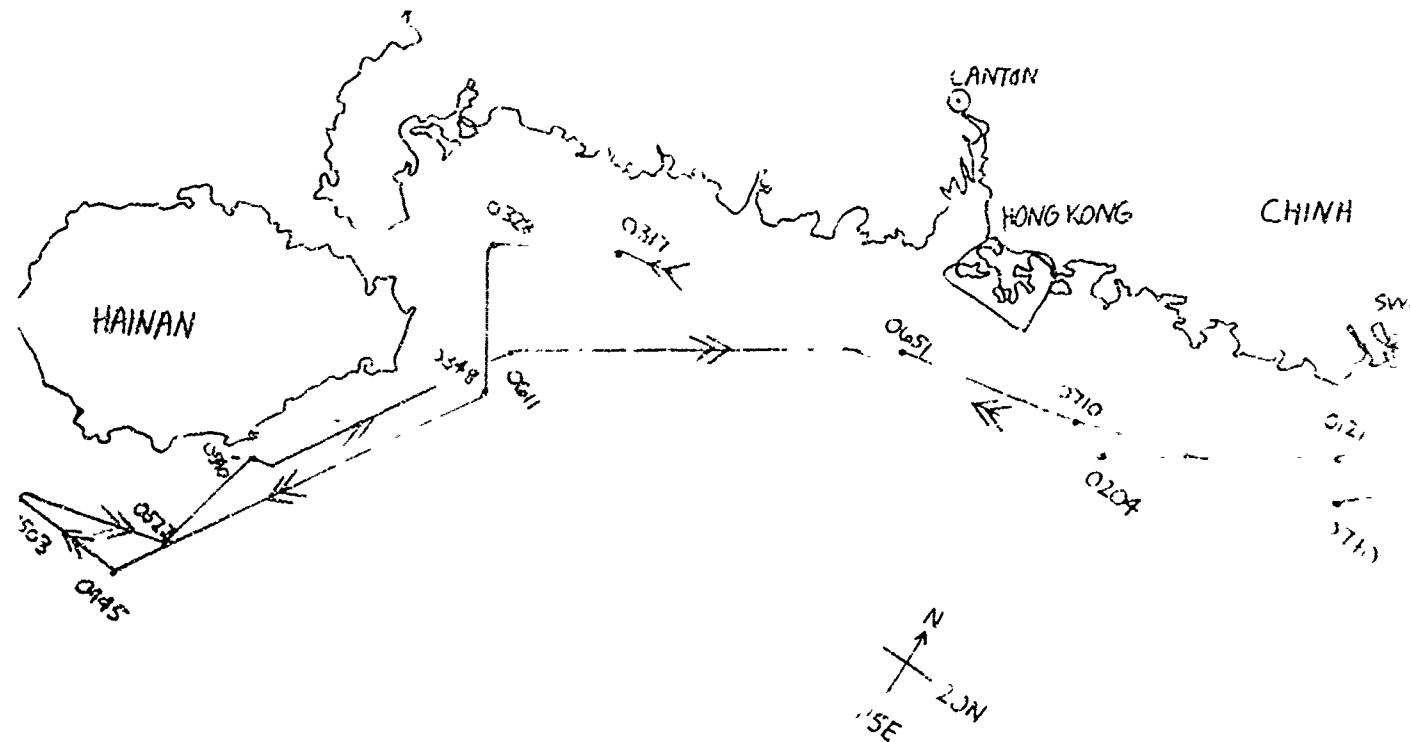


FIGURE 7. Mission 180, 23 March 1951



FIGURE 7 Mission 180, 23 March 1951



MISSION .81
25 MARCH 1951
MAP TYPE GNC-13

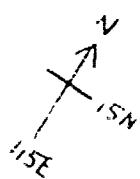
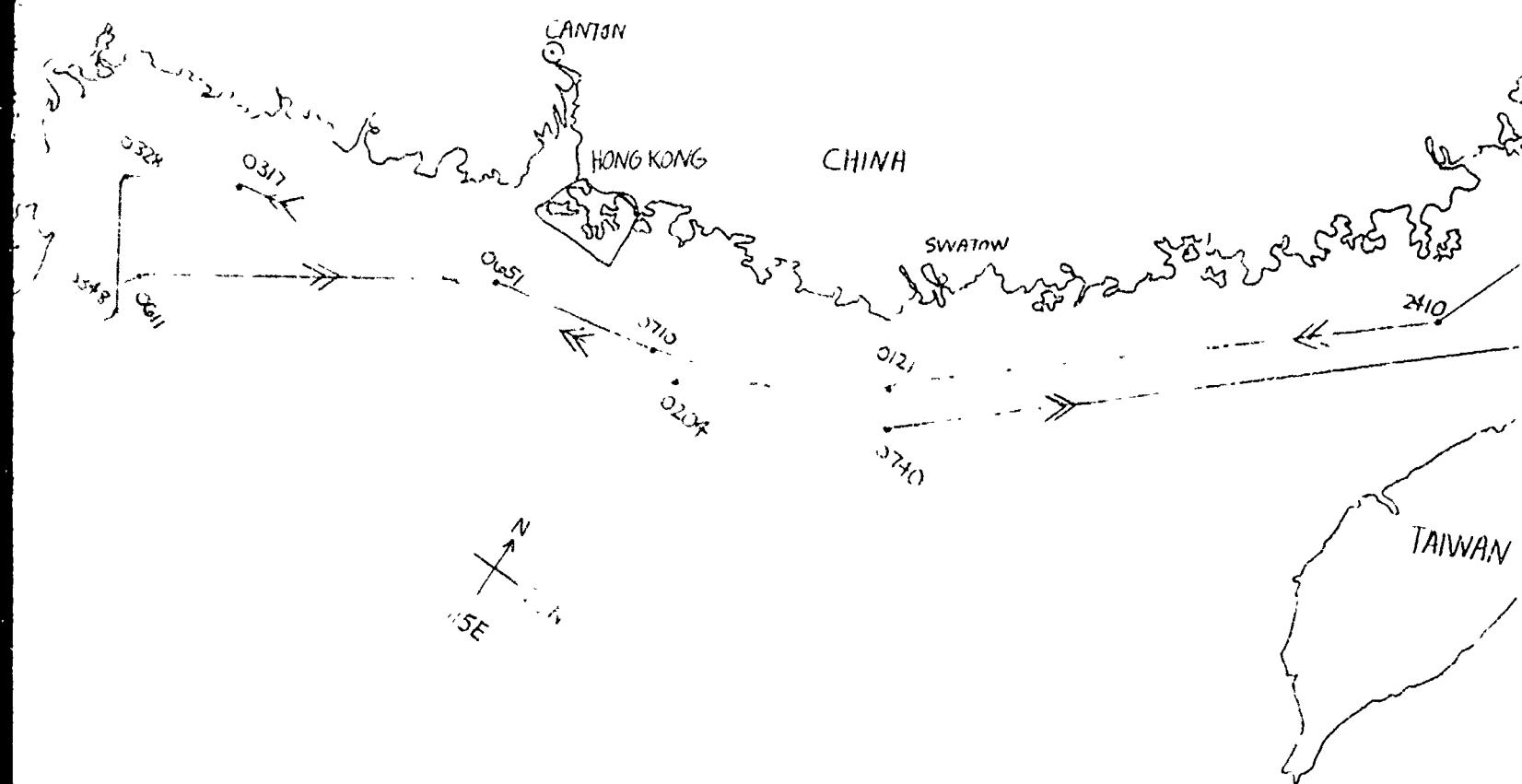
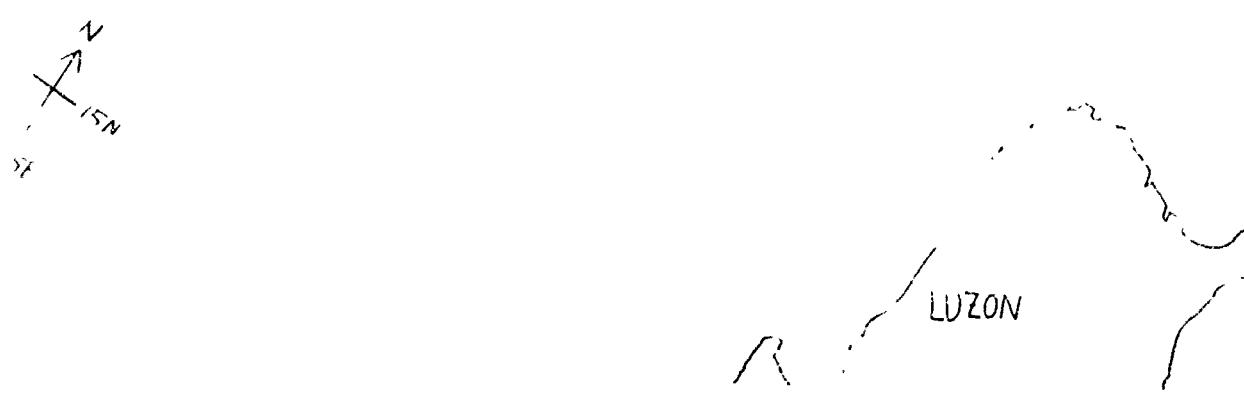


FIGURE 8. Mission 181, 25 March 1951



MISSION 181
25 MARCH 1951
MAP TYPE GNC-13

N
E
S
W



181 25 March 1951

sensitive" areas, located on the borders of the Soviet Union or the People's Republic of China. For these missions, RB-29s, specially equipped with a K-30, 100-inch focal plane camera, attempted to take long-range, oblique photographs of Communist installations.⁴⁰ For example, special photo missions flown on August 8 and 11, 1951, concentrated on the Soviet-occupied Kurile Islands, adjacent to Japan. (Figures 9 and 10) In addition, a 91st RB-29 penetrated Communist Chinese airspace on a mission to photograph the city of Shanghai on August 25, 1951.⁴¹ (Figure 11) Although technical problems often marred collection efforts, these photo missions added to American knowledge of enemy capabilities.⁴²

A comparison of the ECM flights flown in March and August 1951 reveals a shift in emphasis from northwest Korea to the Soviet coast. Mission numbers 199, 200, and 204 (Figures 12, 13, 14) probed Soviet air defenses over the Sea of Japan and near Vladivostok. The remaining missions, numbers 201 and 202KZ, continued surveillance of the People's Republic of China.⁴³ (Figures 15 and 16) To a large extent, the shift away from northwest Korea acknowledged the danger posed by large numbers of MiG-15s. By this stage of the fighting, Communist fighters menaced even the FEAF's jet reconnaissance aircraft.⁴⁴ Nevertheless, the flights along the periphery of the Soviet Union represented a significant expansion in the scope of US strategic aerial reconnaissance.

⁴⁰ History of the 91st SRS, May 1951, p. 5, USAFHRC.

⁴¹ History of the 91st SRS, August 1951, USAFHRC.

⁴² The K-30 camera was mounted on the left side of the RB-29 at a 15 1/2 degree angle. This caused a major problem for both the crew and the photo interpreters. For optimum results, the aircraft had to be flown with the wing raised, or lowered, 3-6 degrees. Unfortunately, the plane could not maintain a constant heading with this attitude. This constant turn caused the operators to stop and re-align the camera every 8 to 10 miles. In addition, when flying at 25,000 feet, the bottom of a picture would show a target 12 miles away while the top depicted a target 25 miles away. History of the 91st SRS, Vol. 1, May 1951, p. 5, USAFHRC.

⁴³ History of the 91st SRS, August 1951, USAFHRC.

⁴⁴ Futrell, *The United States Air Force in Korea*, p. 548.

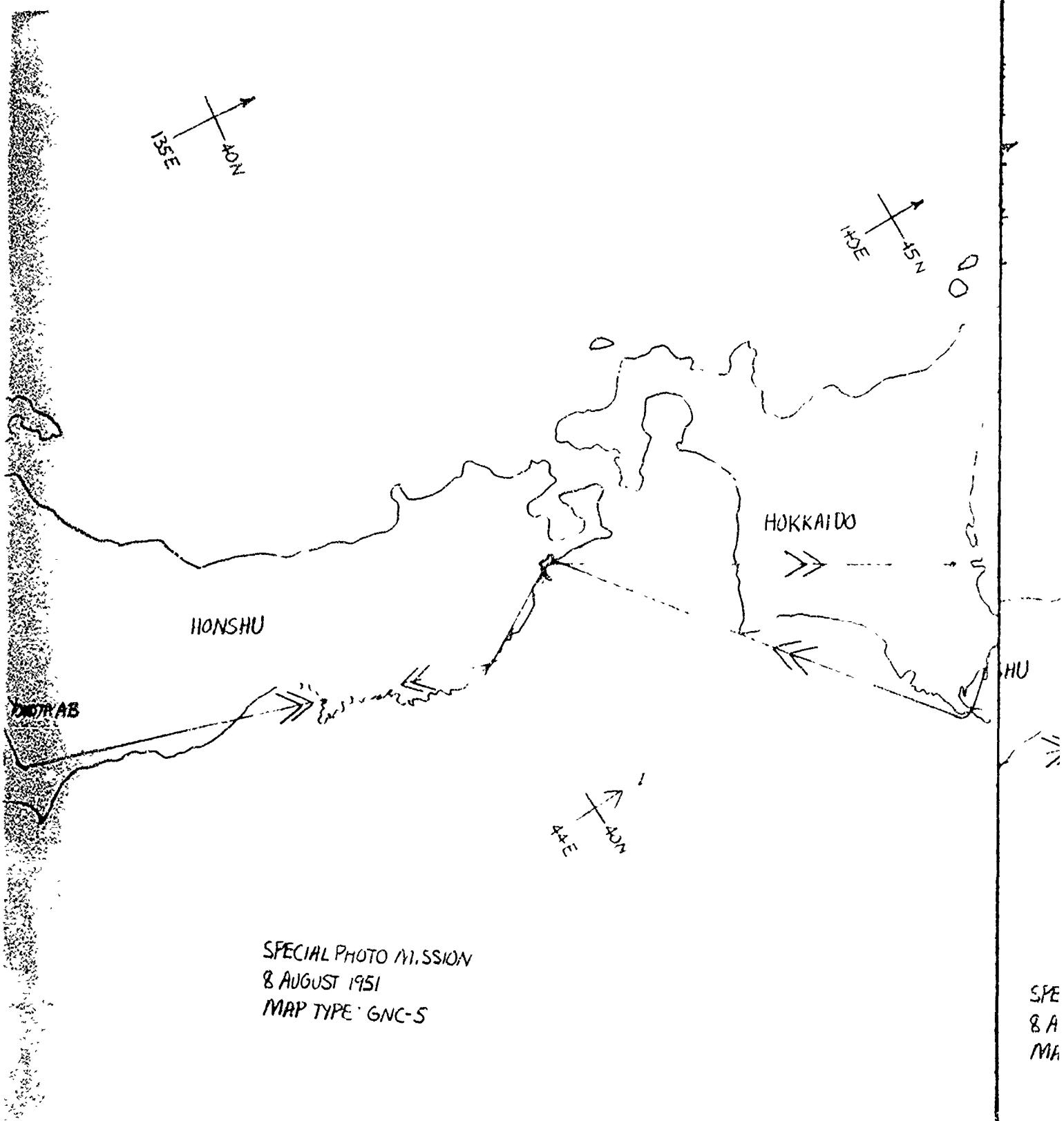
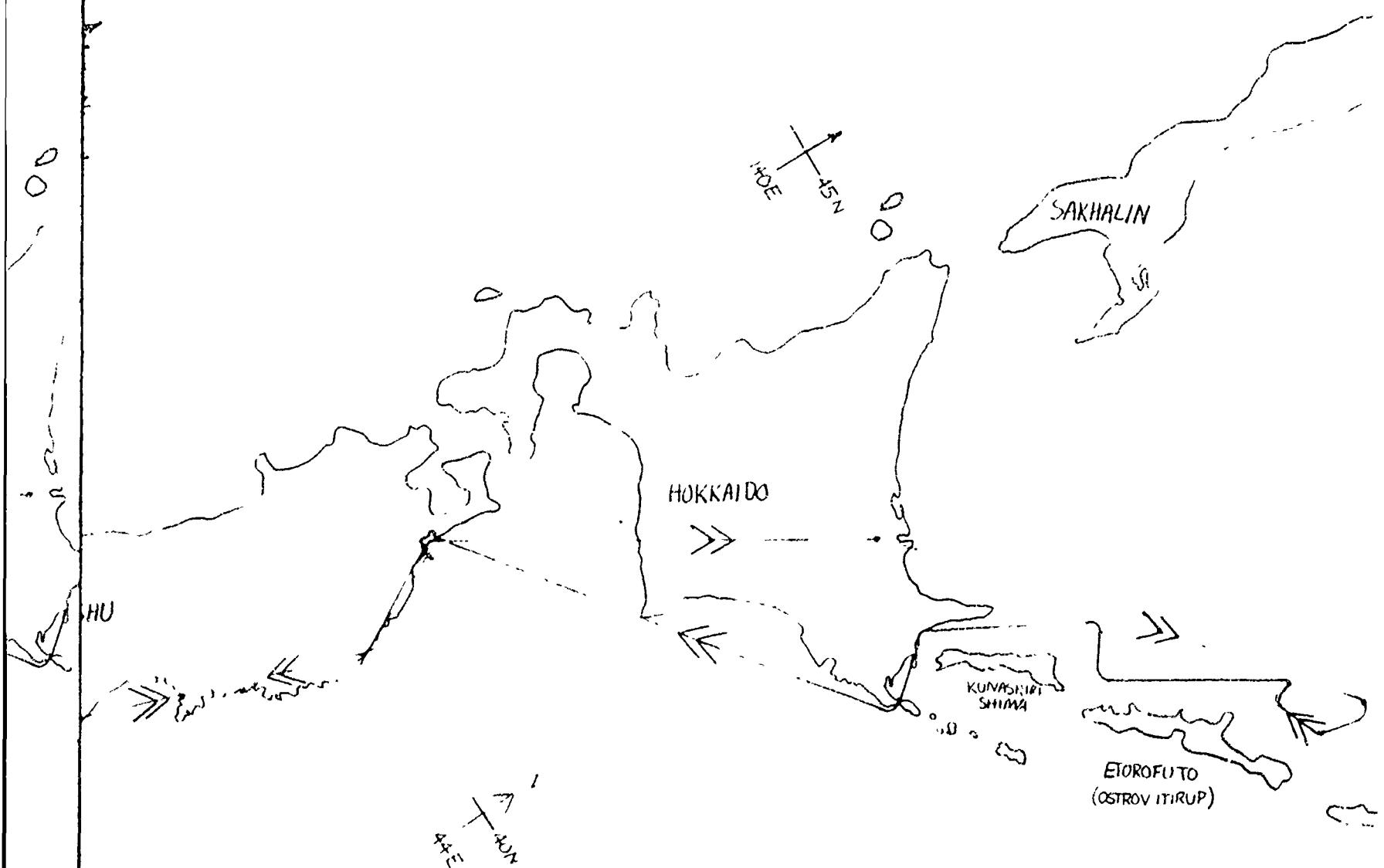
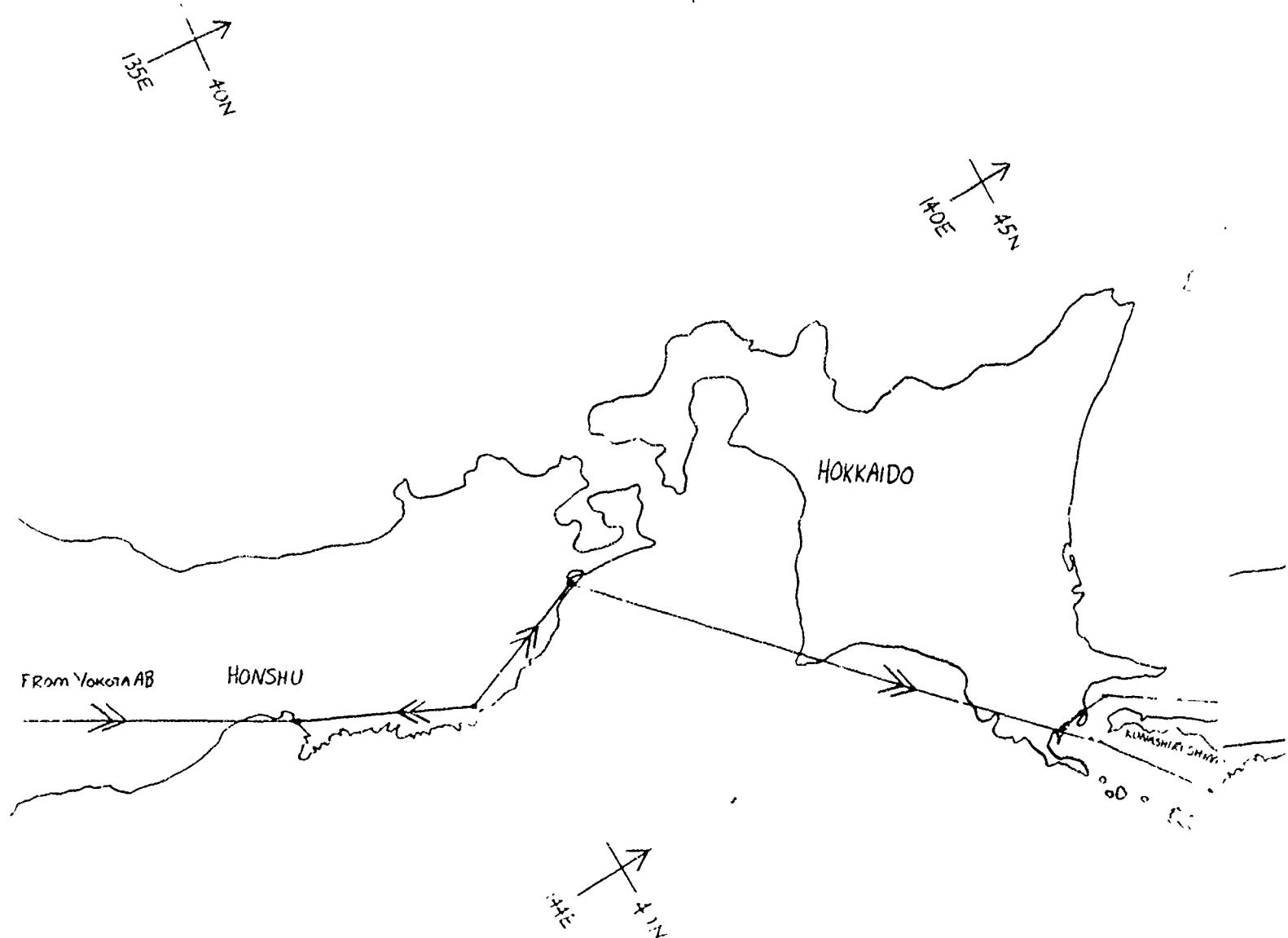


FIGURE 9. Special Photo Mission, 8 August 1951



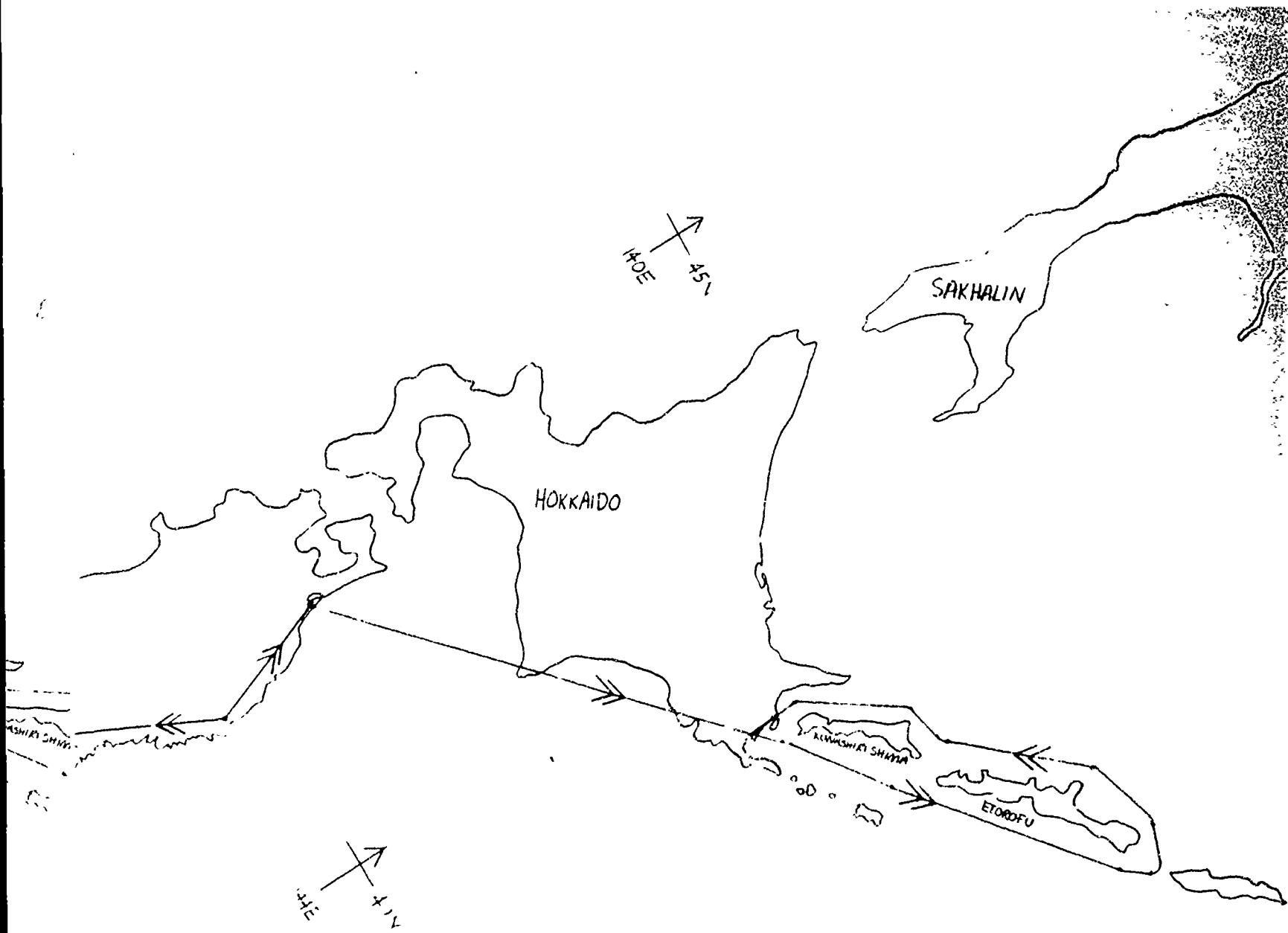
SPECIAL PHOTO MISSION
8 AUGUST 1951
MAP TYPE GNC-5

9 Special Photo Mission, 8 August 1951



SPECIAL PHOTO MISSION
11 AUGUST 1951
MAP TYPE: GNC-5

FIGURE 10. Special Photo Mission, 11 August 1951



SPECIAL PHOTO MISSION
11 AUGUST 1951
MAP TYPE: GNC-5

O. Special Photo Mission, 11 August 1951

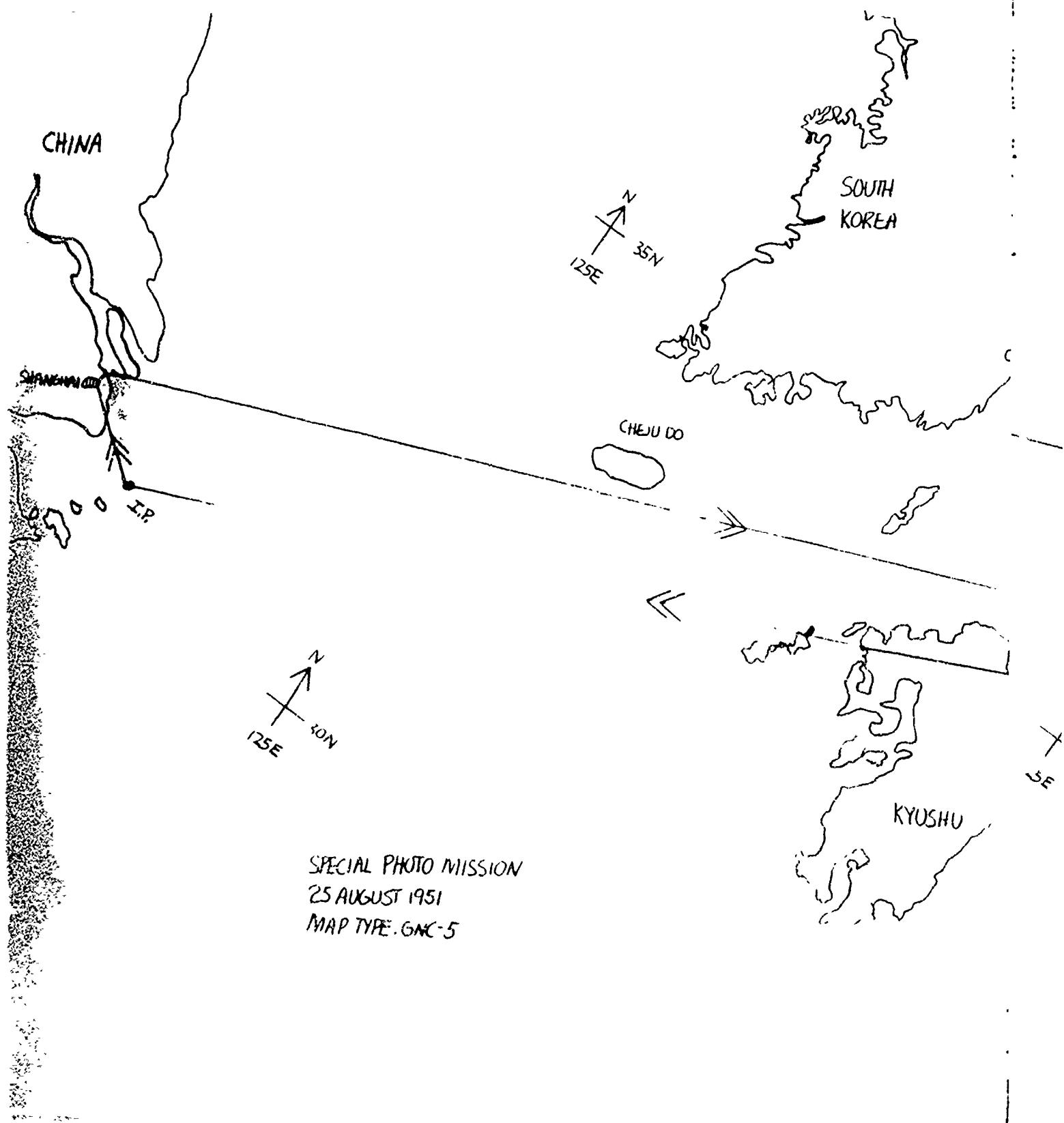
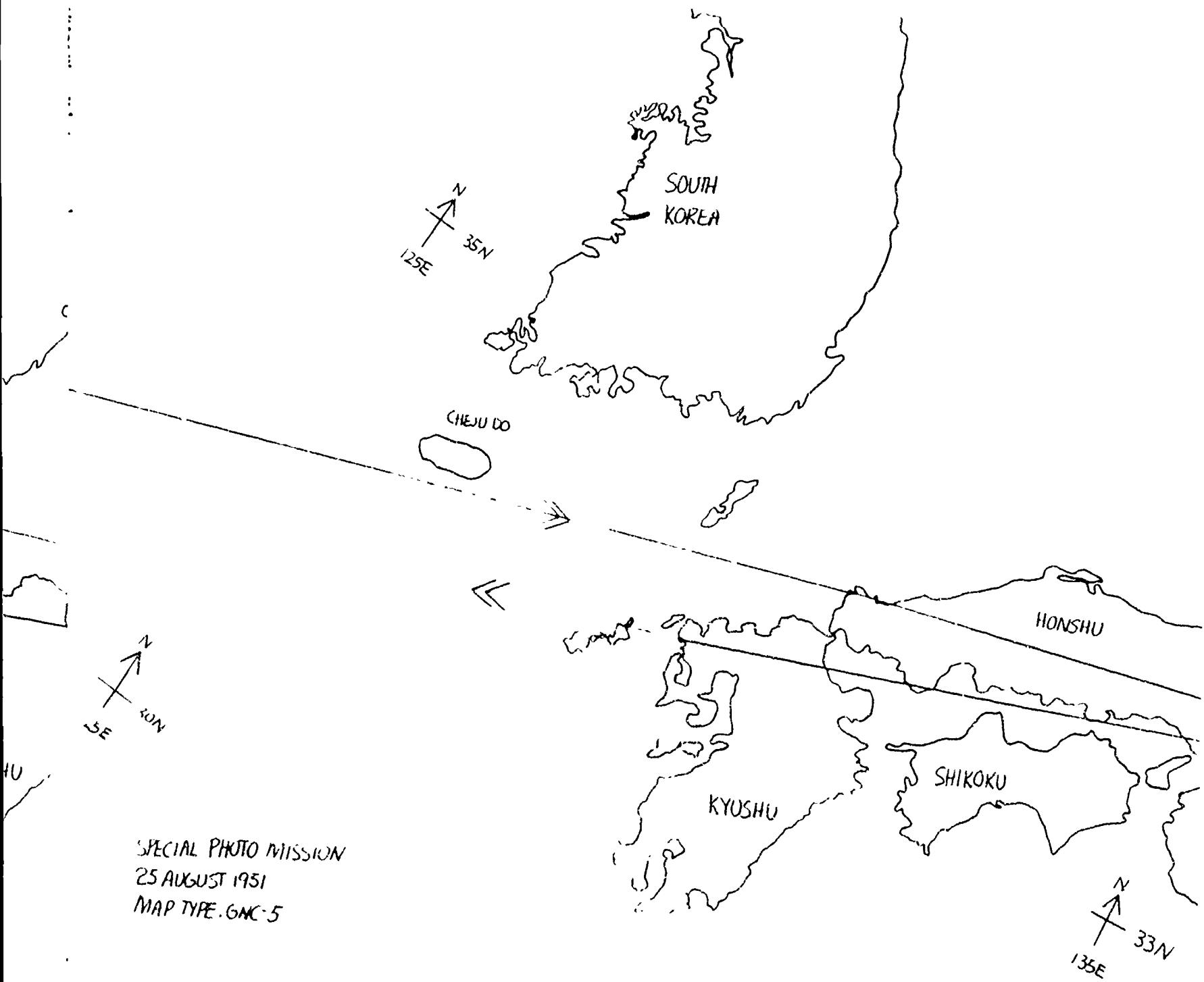


FIGURE 11. Special Photo Mission, 25 August 1951

Sp



Special Photo Mission, 25 August 1951

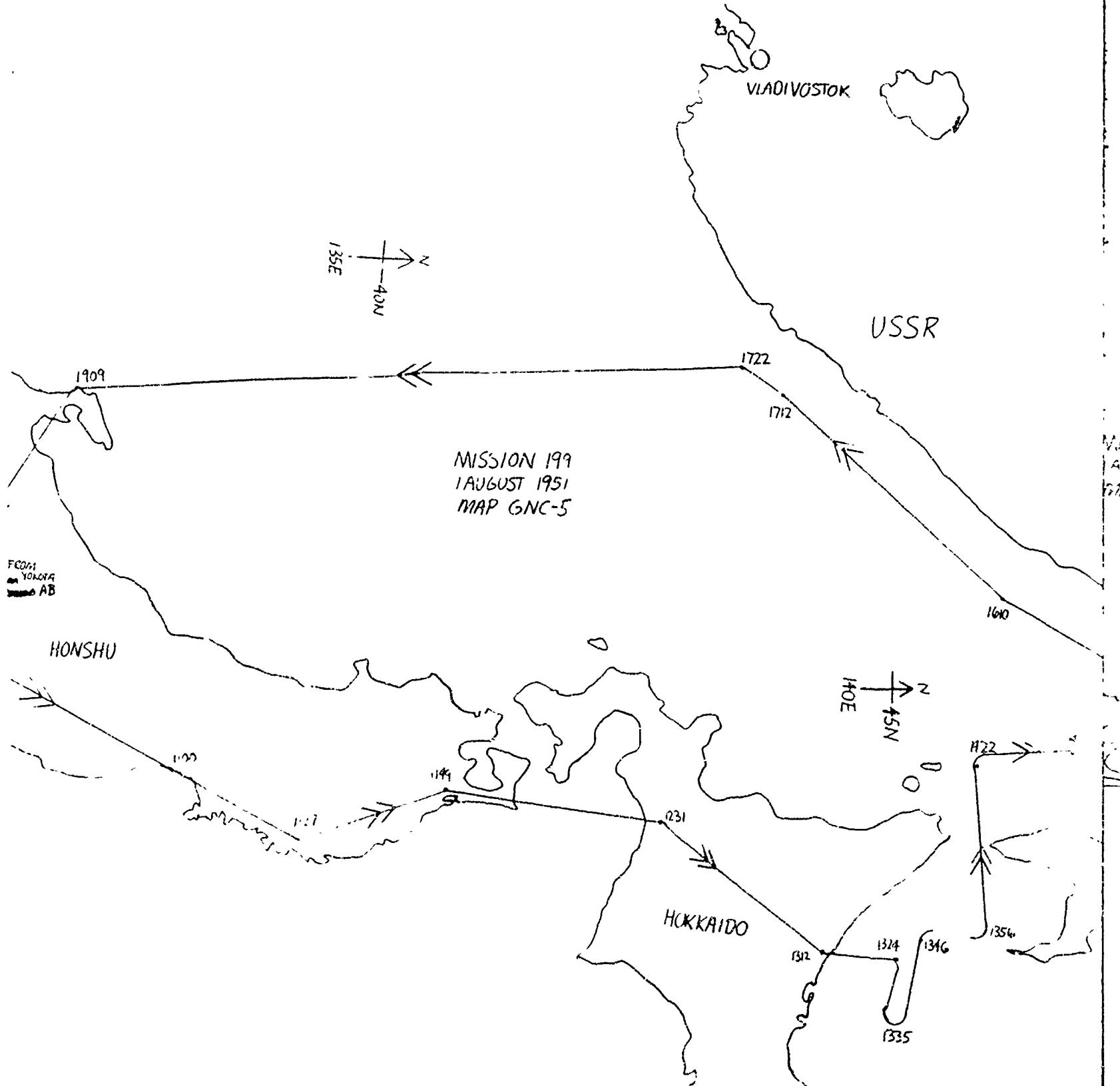


FIGURE 12. Mission 1

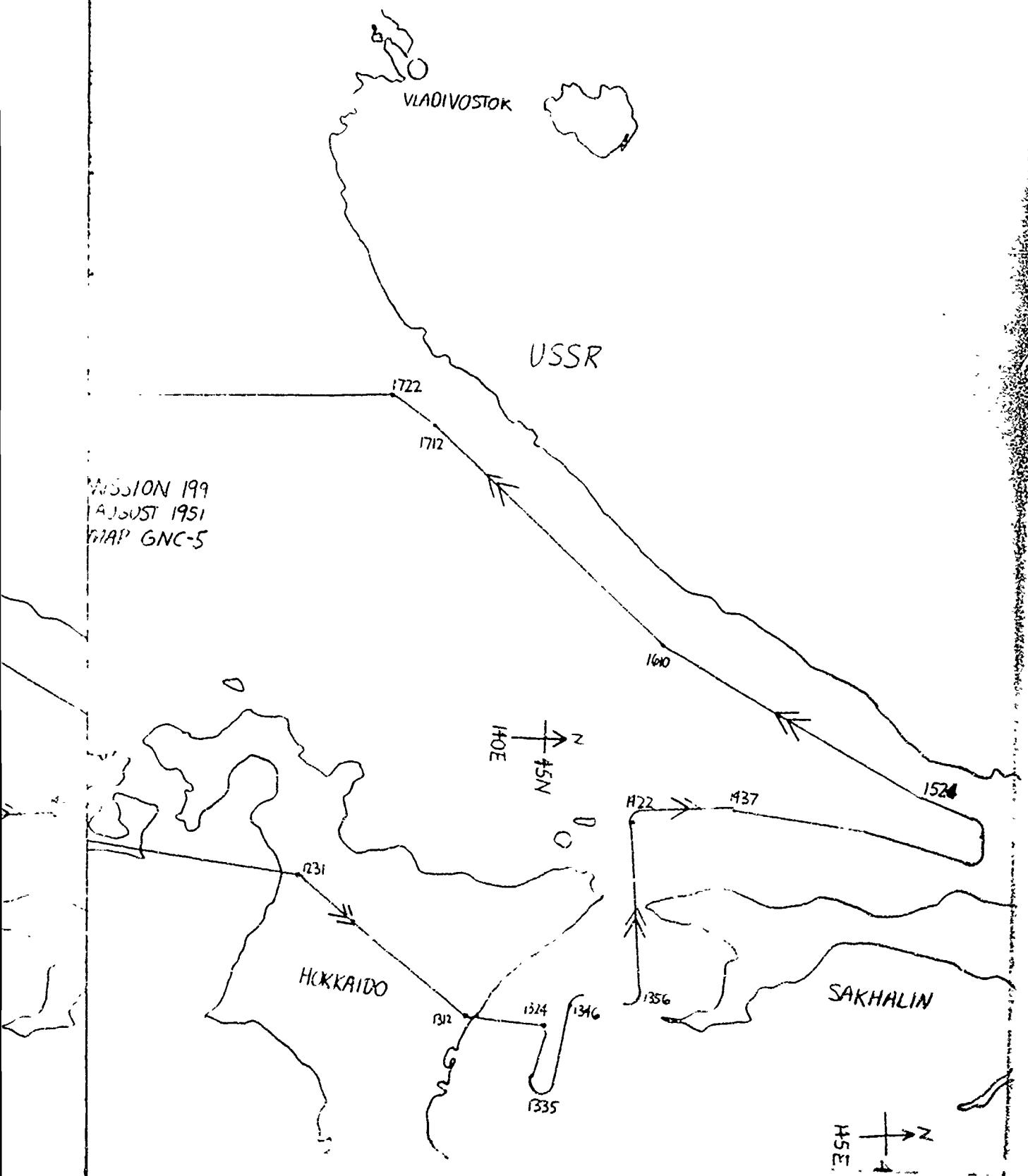


FIGURE 12. Mission 199, 1 August 1951

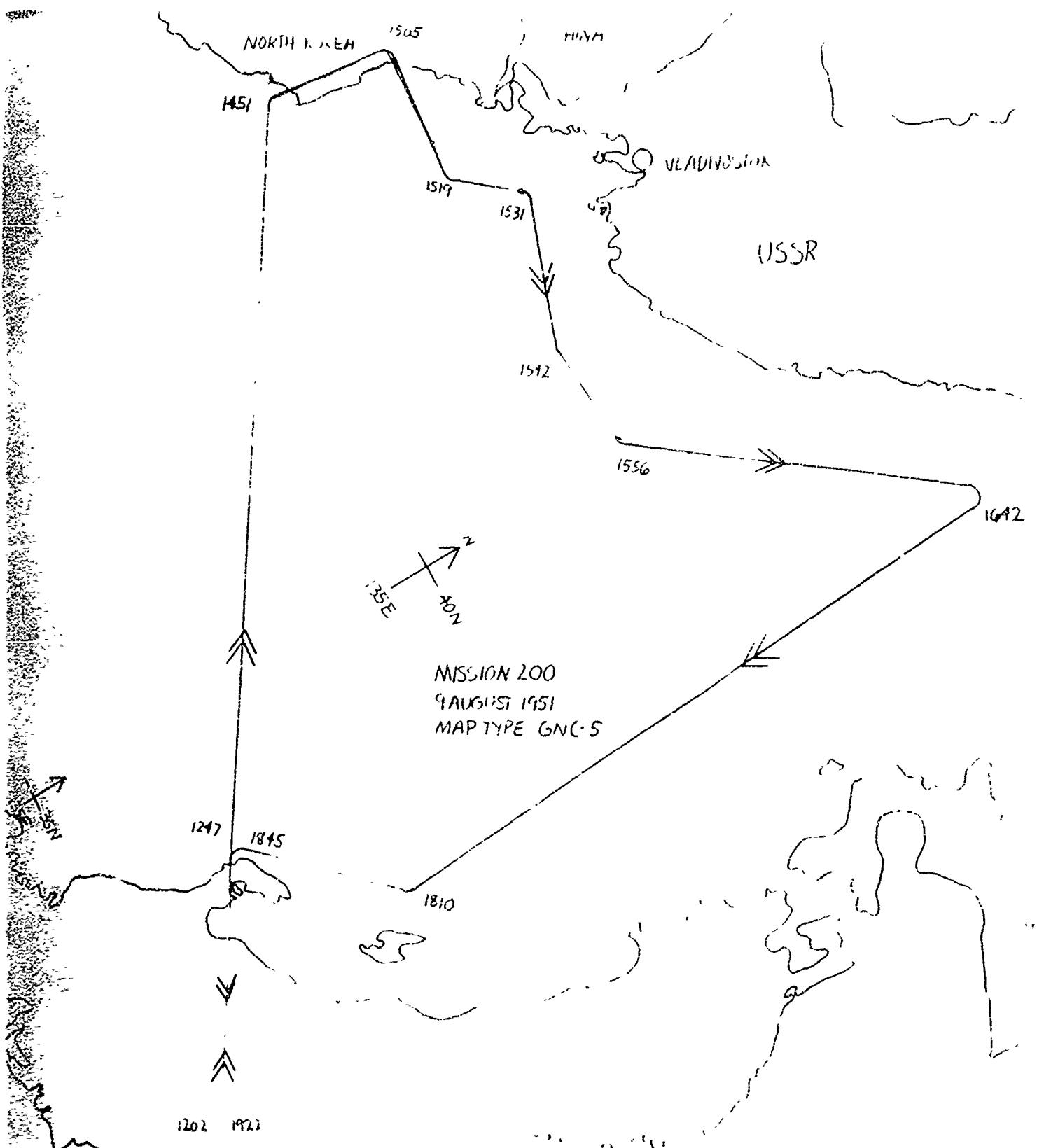


FIGURE 13. Mission 200, 9 August 1951

UR

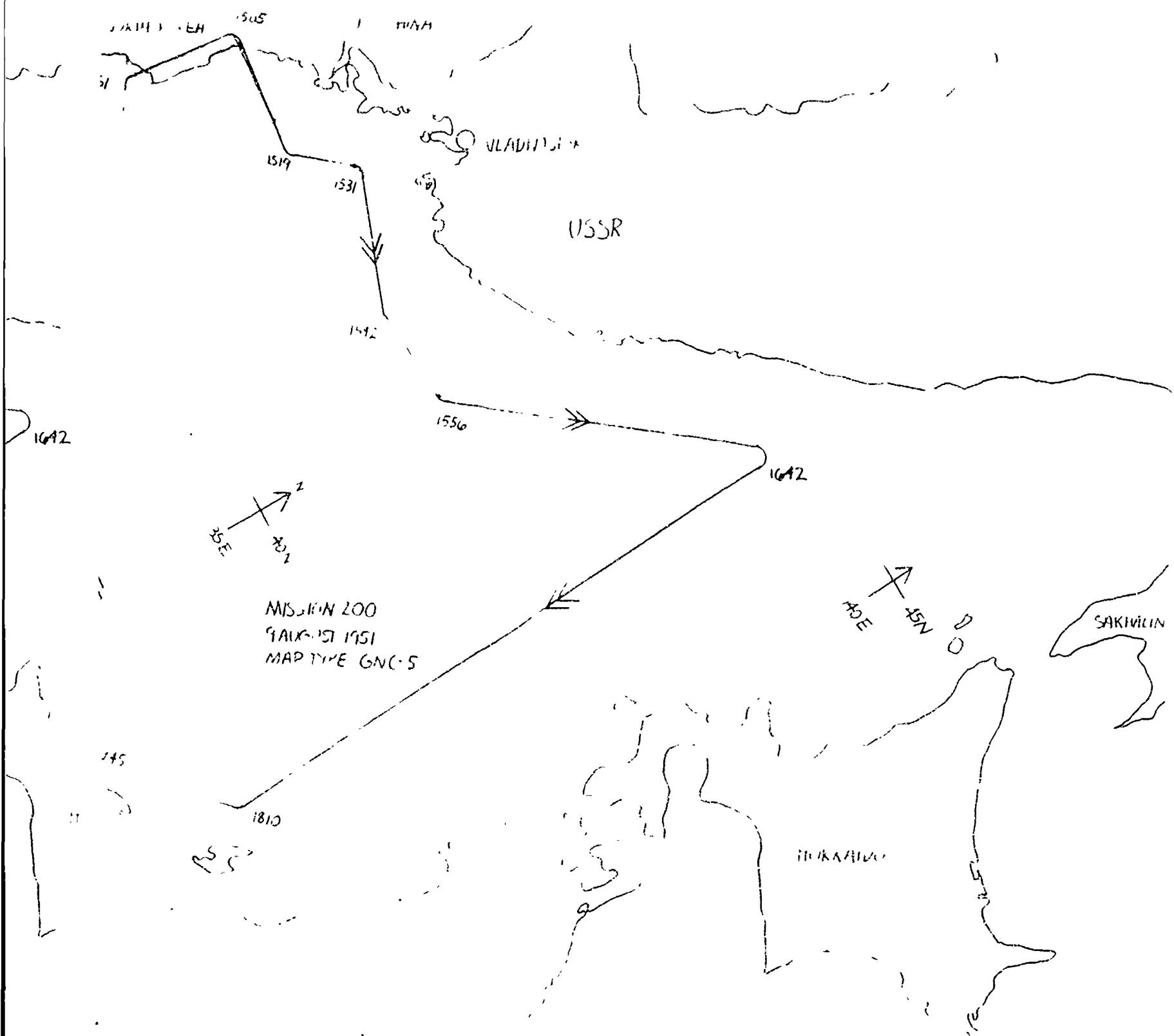


FIGURE 13 Mission 200, 9 August 1951

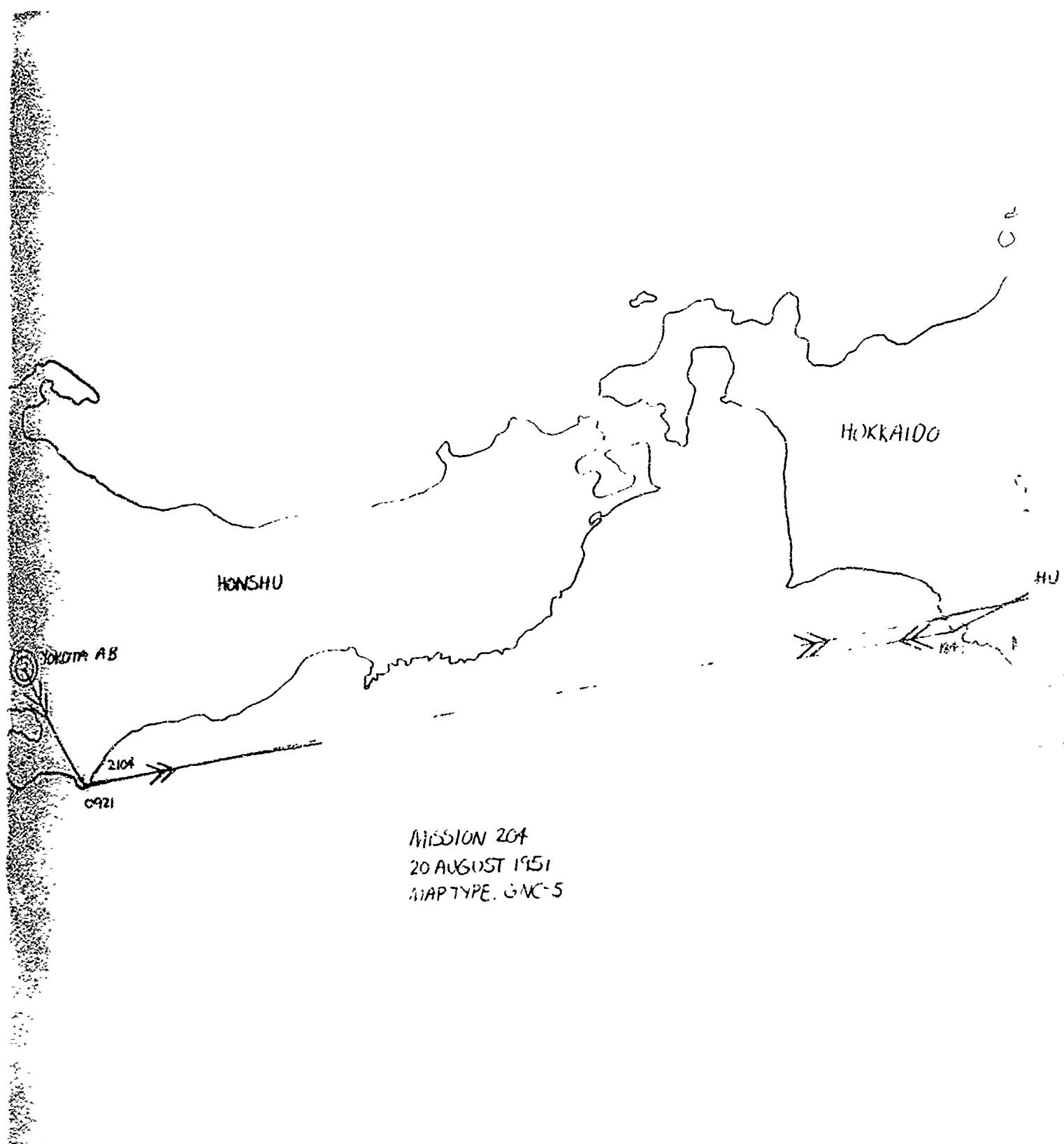
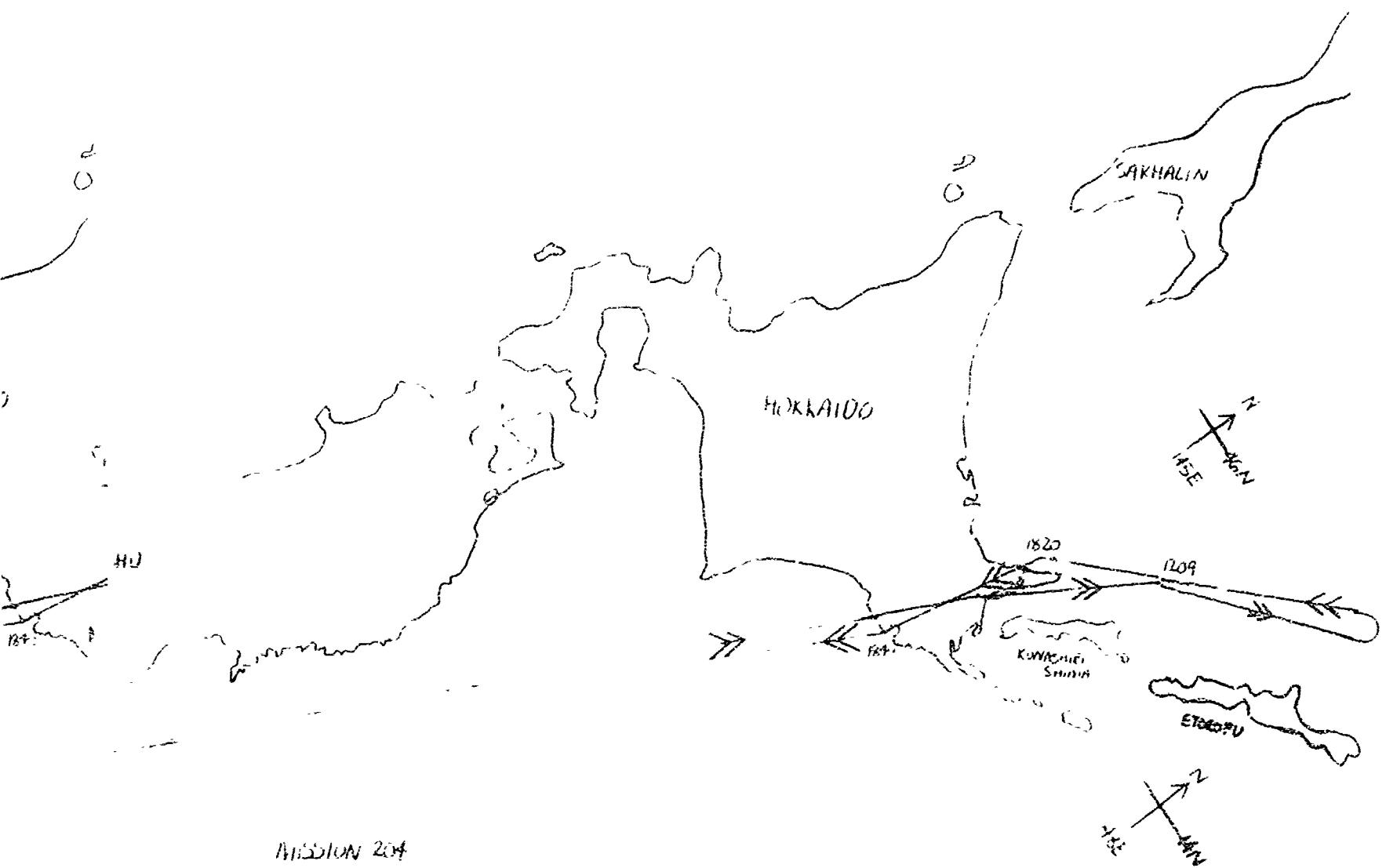


FIGURE 14. Mission 204, 20 August 1951



MISSION 204
20 AUGUST 1951
TAUTYPE 3 WC-5

14 Mission 204, 20 August 1951

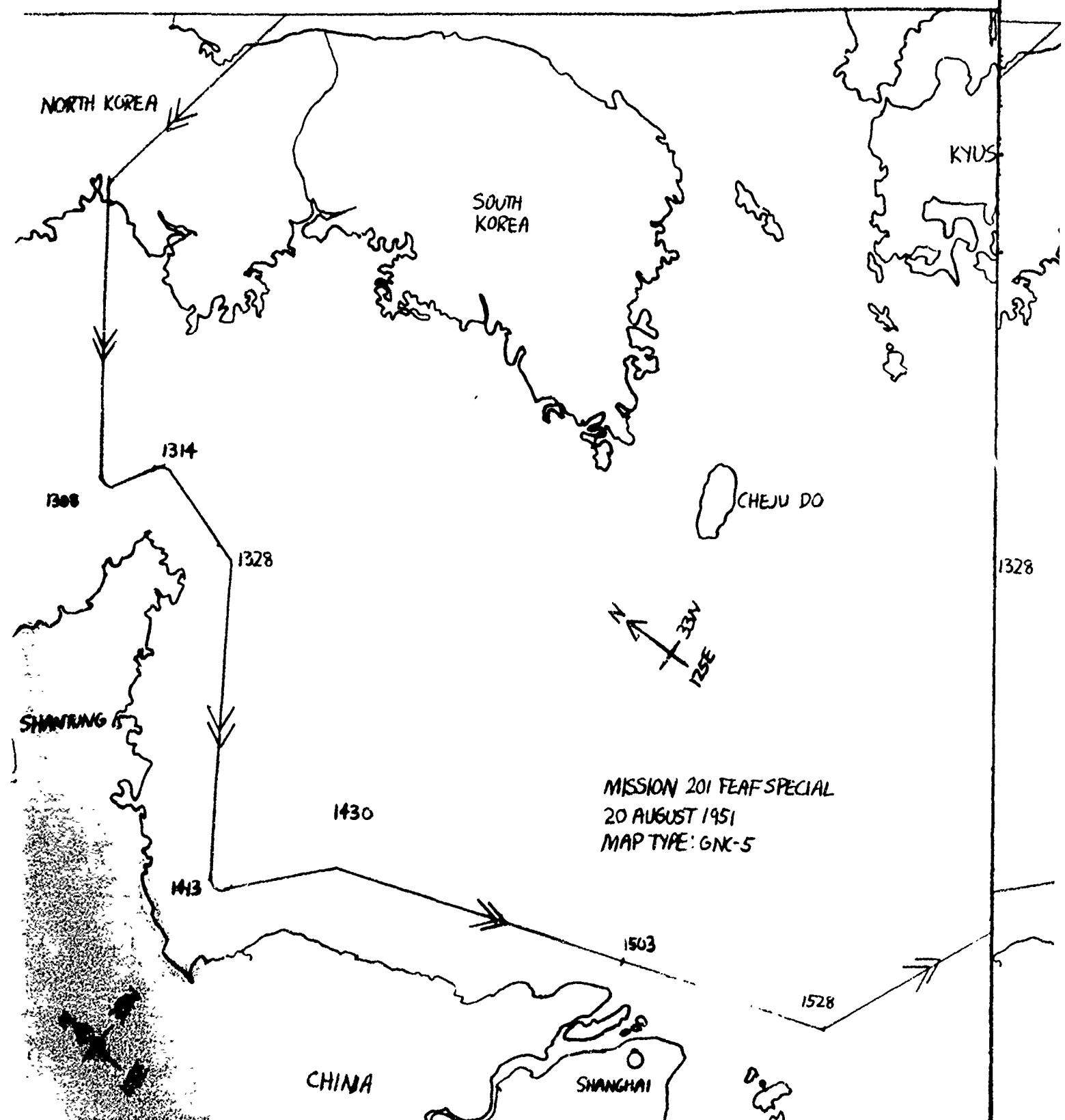
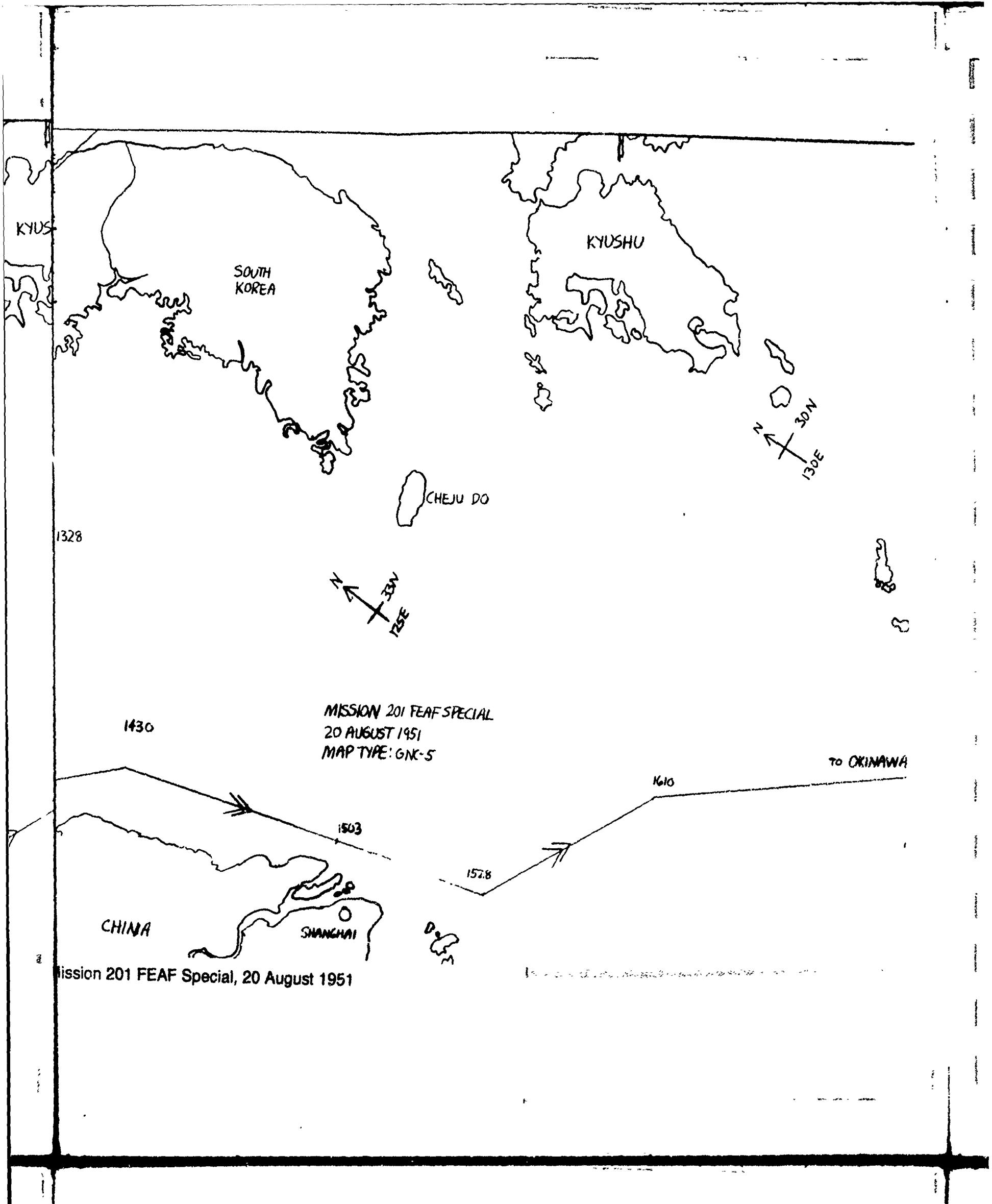


FIGURE 15. Mission 201 FEAFF Special, 20 August 1951



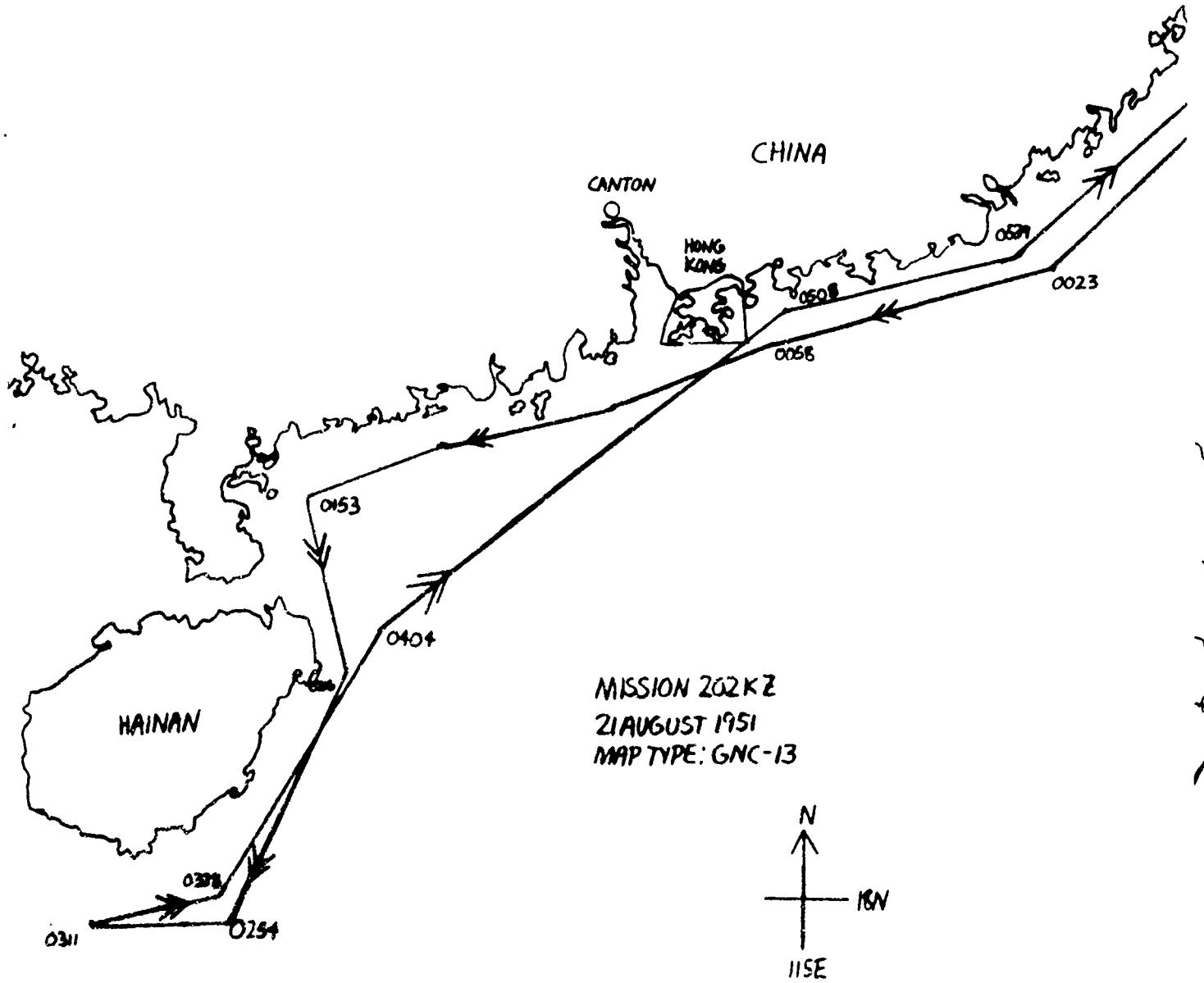
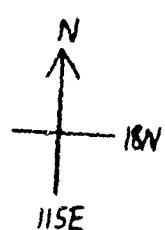
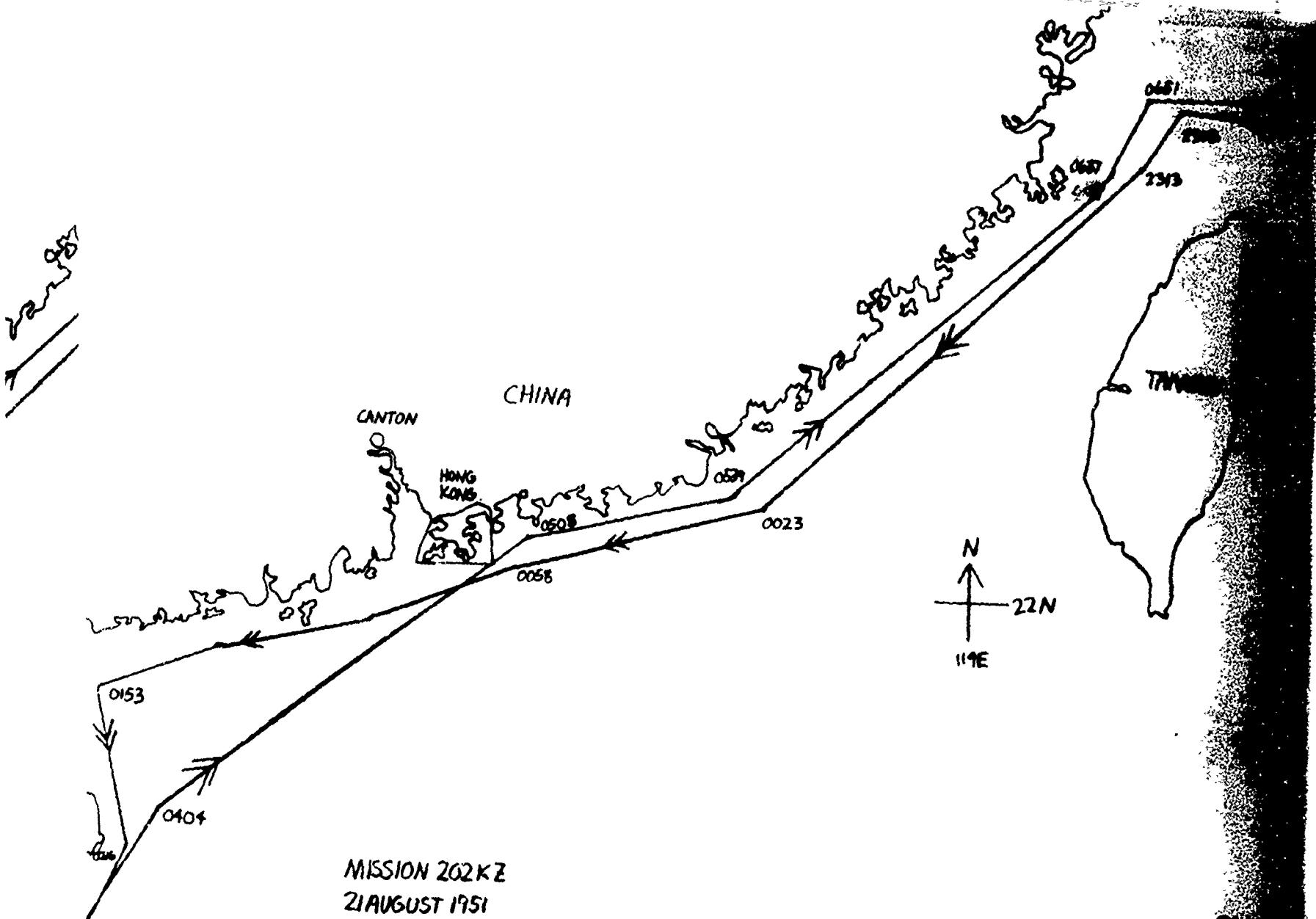


FIGURE 16. Mission 202 KZ, 21 August 1951



6. Mission 202 KZ, 21 August 1951

In the final eighteen months of the war, growing enemy radar defenses threatened USAF strategic air operations in Korea. The numbers and sophistication of the Sino-Soviet radar net increased significantly. By December 1951, thirteen RUS II or "Dumbo" radars operated in the Sinuiju to Sariwon area alone.⁴⁶ In addition, a new type of high frequency GCI radar, nicknamed TOKEN, appeared. By June 1952, Sino-Soviet radar sites guided enemy night fighters to intercept FEAF bomber formations.⁴⁷ During the latter half of 1952, the Communists coordinated antiaircraft artillery (AAA) gun-laying radar with search lights to illuminate bombers as an aid for both night fighters and AAA. As a result, FEAF Bomber Command lost six B-29s and four crews during the month of December alone.⁴⁸ Fortunately, the enemy lacked adequate air intercept (AI) radar in their night fighters that would enable them to close for the final kill. On January 30, 1953, Brigadier General W. P. Fisher, Commander of the Far East Air Forces Bomber Command wrote the following to the SAC Director of Operations:

Without wishing to appear unduly alarmed, the whole feeling here is that these guys are beginning to develop a real overall air defense team which is making our margin of security in operations slimmer all the time. If they ever crack that last link and get an all-weather capability of pressing an accurate firing attack, the B-29 business is really going to get rough.⁴⁹

⁴⁶ History of the Fifth Air Force 1 January 1952 - 30 June 1952, p. 151.

⁴⁷ The TOKEN radar operated in the "S-band" frequency around 3,000 megacycles. First detected in Moscow in 1951, the new GCI radar could direct several fighters simultaneously at ranges up to 70 miles away. Kuehl, "Electronic Warfare," p. 7; Letter, R. C. Lewis, Colonel, Adjutant General, Fifth Air Force, to Commanding General, Far East Air Forces, Subj: Request for priority increase on ECM Aircraft Project, 7 Jul 1952 in Historical Division, Fifth Air Force, History of the Fifth Air Force, 1 January 1952 -- 30 June 1952, File number: K-730.01, v. 2, 1 Jan - 30 Jun 1952, USAFHRC.

⁴⁸ Letter, W. P. Fisher, Brigadier General, USAF, Commanding (FEAF Bomber Command) to Major General John B. Montgomery, Director of Operations, Strategic Air Command, 30 January 1953, in History of the Fifth Air Force, January - July 1953, Vol. 2: Supporting Documents, File number: K-713.01-38, vol. 2, Jan- 27 Jul 1953, USAFHRC.

⁴⁹ Ibid.

Improved enemy radar performance emphasized the equipment limits of FEAF strategic reconnaissance at a time when enhanced Communist air defenses made electronic and photographic intelligence vital. FEAF strategic reconnaissance lacked the aircraft necessary to accomplish its mission. By 1953, a FEAF assessment declared the RB-29 "completely unsuited" for daytime operations where MiG-15s operated. Additionally, the RB-29 lacked an adequate long focal length camera usable at night.⁵⁹ Problems involving the timing of the camera's shutter speed and flash bombs dropped to provide illumination plagued night photography. Even when the equipment worked, photo interpreters found night photos difficult to analyze. Fires caused by bomb strikes distorted the shadows used by photo interpreters to identify the height of buildings.⁶⁰ As a result of mediocre night photography, FEAF Bomber Command sought Bomb Damage Assessment (BDA) from the jet aircraft of the 67th Tactical Fighter Wing. Unfortunately, BDA requests swamped tactical reconnaissance, already overwhelmed by the needs of the Army and 5th Air Force.⁶¹ In theory, the jet RB-45 should have provided BDA coverage; however, the unarmed plane's 500 mph speed was still 160 mph too slow to survive against MiGs. In addition, the RB-45 proved particularly vulnerable to flak. According to a FEAF report, "even the slightest rip, tear, or battle damage affects

⁵⁹"91st Strategic Reconnaissance Squadron (M) Photo," in *History of the Fifth Air Force, January-July 1952*, Vol. 2: Supporting Documents, USAFHRC.

⁶⁰Report on Reconnaissance Conference, (Joint Army-Air Force Reconnaissance Conference, 12-13 August 1952), in *History of the Fifth Air Force 1 July 1952 - 31 December 1952*, Vol. 2, Appendix 1, File number: K-730.01, 1 Jul - 31 Dec 1952, v. 2, USAFHRC.

⁶¹James F. Brady, Lt. Col., USAF, Deputy for Intelligence, (FEAF Bomber Command), "Reconnaissance Plan for the RB-45," n. d., in *History of the FEAF Bomber Command*, Vol. 2: Supporting Documents, File number: K713.01-32, Jul-Dec 1952, v. 2, USAFHRC; *History of the Far East Air Forces Bomber Command, January - July 1953*, Vol. 1, p. 48, File number: K713.01-36, Jan-Jul 1953, v. 1, USAFHRC.

the [RB-45's] operational characteristics."⁵² Thus, obsolete aircraft prevented strategic reconnaissance from providing adequate support for FEAF Bomber Command.

Compounding equipment problems, organizational flaws hindered reconnaissance efforts. For most of the war, the Strategic Air Command and the Far East Air Forces acted as competing entities. Inadequate coordination snarled reconnaissance efforts in Korea. SAC viewed preparation for a strategic air campaign against the Soviet Union as the Air Force's top priority. Under General LeMay's command, SAC recognized its shortcomings and initiated vigorous training and equipment modernization programs. As a result, SAC considered sending assets to Korea as a diversion of scarce resources. In contrast, the Far East Air Forces concentrated on the war at hand. SAC's reluctance to release aircraft and crews frustrated FEAF planners. In particular, FEAF wanted the new B-47s and RB-47s that entered the SAC inventory in 1953. Fearing compromise of the bomber's performance capabilities, General LeMay refused to release the assets.⁵³ Along similar lines, SAC resisted full use of active electronic countermeasures.⁵⁴ Although FEAF Bomber Command (largely manned by SAC crews and staff) eventually employed jamming to counter enemy air defense radars, SAC worried that revealing too much ECM

⁵² Brady, "Reconnaissance Plan for the RB-45," USAFHRC.

⁵³ Instead, SAC offered additional RB-45s. Telegram, Twining from LeMay, CG 0277, 1 Jan 53, File number: B-23446, Box B-203, Papers of Curtis E. LeMay, Library of Congress, Washington, D. C. (hereafter abbreviated LOC); Telegram, Twining to LeMay and Weyland, 18 Feb 53, File number: B-24065, Box B-203, Papers of Curtis E. LeMay, LOC.

⁵⁴ "Active" countermeasures involve electronic jamming, while the use of chaff or window comprise "passive" electronic countermeasures. FEAF Bomber Command first authorized limited active ECM on November 24, 1950. On April 17, 1951, following the Sinuiju bomber raid, FEAF Bomber Command allowed greater use of electronic jamming, but still required prior headquarters approval. Eugene Freeman, Captain, USAF, FEAF Bomber Command ECM Summary, September 1951, Annex IV to FEAF History of ECM During the Korean Conflict, File number: K-720.04C, Jun 1950-Jul 1953, USAFHRC.

capability might jeopardize its atomic strike mission.⁵⁶ Finally, the commands failed to coordinate emergency war planning. The Strategic Air Command and Far East Air Forces each planned to use the 91st SRS in the event of general war and FEAf plans duplicated targets listed in SAC Operations Plan 62-51.⁵⁷ Although General LeMay and SAC prevailed with the Air Staff, the lack of close cooperation hindered strategic reconnaissance.

In a similar situation, reconnaissance during the Korean War suffered due to poor communication between FEAf Bomber Command and the Fifth Air Force. Although both organizations were components of the Far East Air Forces, different operational outlooks marred cooperation. FEAf Bomber Command attempted to wage a strategic air war in accordance with Air Force doctrine, while the Fifth Air Force was primarily concerned with air superiority and tactical aviation. Until a reconnaissance conference in August 1952 addressed the problem, the Fifth Air Force staff lacked access to reconnaissance photography flown by the 91st SRS.⁵⁷ Likewise, the Fifth Air Force complained of marginal ECM and ELINT capability when the 91st SRS had assembled comprehensive data on the enemy radar system. For unexplained reasons, FEAf Bomber Command failed to share information.

Following the close of hostilities in Korea, the Far East Air Forces assessed reconnaissance operations during the conflict. Commissioned by General O. P. Weyland, commander of FEAf, the study scrutinized the relative effectiveness of tactical and strategic operations. The report's introduction stated, "Aerial reconnaissance proved to be of greater value than in any

⁵⁶ Kuehl, "Electronic Warfare," p. 14.

⁵⁷ Letter, Thomas S. Power, Major General, USAF, Deputy Commander, Strategic Air Command to Colonel William F. Coleman, Office C/S, GHQ, FEC, 14 March 1952, File number: B-16973, Box B-200, LeMay papers, LOC.

⁵⁷ Report on Reconnaissance Conference, (Joint Army-Air Force Reconnaissance Conference, 12-13 August 1952), USAFHRC.

previous conflict and was by far the most valuable means available for obtaining intelligence on enemy activities. Aerial reconnaissance figured predominantly in every phase of the conflict.⁵⁴ The size of the reconnaissance effort alone supported this statement. Tactical reconnaissance operations in Korea surpassed even the records established during World War II. For example, the 67th Tactical Reconnaissance Group flew 2,400 sorties in May 1952, while the highest number flown by a comparable group in World War II was 1,300. Likewise, the photo group supporting the US Third Army in Europe processed 243,175 negatives a year, while the 67th Group developed 736,684.⁵⁵

Despite the initial statements of praise, the FEAF assessment lambasted several key aspects of reconnaissance support. The report attacked the inadequate performance of USAF reconnaissance planes in relation to enemy fighters. Inferior speed and altitude performance denied reconnaissance aircraft the freedom of movement needed to assess enemy positions. Furthermore, the study listed several technical problems which marred results:

- Cameras failed to compensate for image motion caused by the speed of jet aircraft.
- Night photoflash bombs lacked the necessary brightness and, as a result, produced marginal pictures.
- Inadequate maps reduced SHORAN bombing effectiveness.⁵⁶

Although equipment problems handicapped reconnaissance efforts, the FEAF report cited a shortage of trained personnel as the greatest problem. Prewar budget cuts left a void in the initial number of intelligence analysts,

⁵⁴ FEAF Historical Report, Nov 1953, "Development of FEAF's Intelligence Collection Plan," p. 34, File number: K-720.02, Box 4, Nov 1953, USAFHRC; An expanded version is found in "FEAF Reconnaissance in the Korean Conflict," p. 1, in FEAF Report on Korea, File number: K-720.04D, 25 Jun 1950 - 27 Jul 1953, USAFHRC.

⁵⁵ Furell, *The United States Air Force in Korea*, p. 556.

⁵⁶ FEAF Historical Report, November 1953, p. 35 & p. 40, USAFHRC.

photo interpreters, and photographic technicians, while short tour lengths continued the lack of experienced personnel later in the war. In some fields, manning dropped below forty percent of authorized strength.⁶¹ Adding to the problem, many personnel assigned were of poor quality. For example, twenty-one percent of the airmen manning the 67th Tactical Reconnaissance Wing represented the lowest skill and aptitude scores or possessed disciplinary infractions.⁶²

The FEAF assessment concluded by advocating a permanent, peacetime reconnaissance program. The Korean War demonstrated that reconnaissance had lagged behind. Collection, processing, and analysis suffered from equipment and personnel shortages. Additionally, the report emphasized the need for detailed, accurate mapping before hostilities start. The Korean experience taught that delay drained scarce reconnaissance resources in the critical, initial phase of conflict. In the event of atomic war, there might not be enough time to conduct pre-strike mapping.⁶³ Therefore, the study presented the two major lessons learned in the conflict:

One important lesson repeatedly emphasized by experience in Korea was that units which may be committed to combat should be organized with wartime personnel and equipment. Units which must absorb and train new personnel are not ready. . . .⁶⁴

There was an urgent need for an organization whose continuing responsibility would be to anticipate the needs of aerial reconnaissance, in whatever phase or field, and to devise and develop the systems, equipment, practices, and techniques necessary to fulfill these needs.⁶⁵

⁶¹ "FEAF Reconnaissance in Korea," pp. 1-2, USAFHRC.

⁶² "Of the airmen assigned, 261 had a Court-Martial Conviction or Article 15 on their records, 123 were at the 10 skill level, 136 had a below IV average aptitude index. This was a total of 520, or 21% of total manning. Ideally, there should be no more than five to eight per cent of such personnel for maximum efficiency." "FEAF Reconnaissance in the Korean Conflict," (p. 67), USAFHRC.

⁶³ "FEAF Historical Report, November 1953, p. 43, USAFHRC.

⁶⁴ "Personnel Problems," in FEAF Report on Korea, (p. 58), USAFHRC.

⁶⁵ "FEAF Historical Report, November 1953, pp. 35-36, USAFHRC.

The net effect of the Korean War upon aerial reconnaissance closely followed the recommendations of the FEAF study. Fear of the Soviet threat and a perceived intelligence weakness combined with war experience to promote an on-going program of aerial surveillance. With the creation of the 55th SRW, the Air Force created an organization solely dedicated to strategic reconnaissance, one in which peacetime training and tactics could be developed. Also, enhanced ECM capabilities resulted in improved analysis of enemy defenses. The routes explored by the 91st SRS combined with SESR sorties flown in the Baltic to produce an expanded scope of activity; the precedent established proved important for reconnaissance operations throughout the decade.

As a test of strategic air war, Korean War experience proved inconclusive. Advocates of strategic air power noted that even aging B-29 bombers successfully completed assigned missions. Although the Sinuiju missions of April and October 1951 proved a setback, a shift to night missions and increased use of ECM countered enemy defenses. FEAF Bomber Command statistics showed 35 aircraft lost out of 23,572 sorties -- a minuscule .0015 loss rate.⁶⁶ Furthermore, in Korea, the Air Force never employed atomic bombs -- the trump card of strategic bombardment. On the other hand, the short-range, fighter-escorted missions over Korea shared little with the long-range sorties planned for the USSR. In a general war, SAC bombers would face first-line Soviet radar and fighter defenses. Whereas MiGs rarely pressed attacks against bomber formations over Korea, in all probability SAC air crews

would face fighters flown with suicidal tenacity in defense of Soviet targets.

⁶⁶ Annex XVI to *FEAF History of ECM During the Korean Conflict*, 3 May 1954, File number: K-720.04C, Jun 1950-Jul 1953, USAFHRC.

Finally, in the Korean War, the initial phase of the air war permitted unopposed strategic reconnaissance. This reduced the problem of identifying targets and made a "precision" air campaign possible. In a general war, strategic reconnaissance faced daunting missions -- finding strategic bombing targets, analyzing air defenses, and assessing bomb damage. Against Soviet air defenses, obsolete strategic reconnaissance aircraft faced annihilation.⁹⁷

⁹⁷ The 91st SRS lost eight aircraft (7 RB-29s and 1 RB-45) during the Korean War. Considering that the squadron never numbered more than twelve RB-29s and four RB-45s, this substantiates a rather pessimistic view. Annex XV to *FEAF History of ECM During the Korean Conflict*, USAFHRC.

CONCLUSION

The JCS and everyone else committed one cardinal sin. We seriously misjudged Chinese communist reaction to our plans to cross the 38th parallel. It is the duty and responsibility of military advisers to gauge a potential enemy's *capabilities* rather than his *intentions*. In this case, we Joint Chiefs allowed ourselves to be overly influenced by various estimates of Chinese communist intentions. As historians have now shown, those who drew those estimates ignored too many obvious warning flags and miscalculated badly.

Omar N. Bradley¹

photo reconnaissance . . . It is the one positive means by which we are able to study the enemy's back yard. Its relative importance cannot be over-rated we must have.

Unidentified Army Representative to FEAf Reconnaissance conference, August 1952²

From the first balloon ascent in 1903, aerial reconnaissance provided an unmatched tool for commanders. Aerial observation offered a means to surprise the foe, or equally important, prevent enemy surprise. World War I experience introduced photo reconnaissance as a valuable source of tactical intelligence. The Great War also inspired a generation of theorists who viewed air power as a new, decisive means of warfare. Emphasizing the airplane's ability to circumvent traditional armies and navies, theories of strategic air war called for aircraft to strike directly the enemy's vital industrial and military

¹ Bradley and Blair, *A General's Life*, p. 561.

² "FEAF Reconnaissance in Korea," p. 20, USAFHRC.

centers. Unfortunately, as pioneers developed aviation technology, aerial reconnaissance lagged. In the US Army Air Corps, Captain George Goddard's innovative aerial cameras proved a rare exception; otherwise, reconnaissance methods remained shackled to First World War practices.

During World War II, aerial reconnaissance played a key role in the success of Allied strategic bombing campaigns. Using techniques fostered by Britain's Royal Air Force, Allied photographic reconnaissance aircraft provided the information necessary to identify targets, to plan strikes, and to assess bomb damage. With the introduction of effective, radar-guided air defense systems, electronic warfare emerged as a new aspect of aerial combat. Although Britain and Germany played leading roles in the overall development of electronic warfare tactics and equipment, the United States advanced the specialized field of airborne electronic reconnaissance. Dr. Frederick E. Terman's Radio Research Laboratory pioneered ELINT and ECM technology and the USAAF's specialized Ferret aircraft adapted the new equipment to the strategic air war. Despite electronic warfare's vital contribution, eventual Allied air superiority reduced the need for electronic reconnaissance. In addition, the atomic bomb's impact overshadowed the role of electronic warfare. Thus, strategic aerial reconnaissance emerged from World War II with a mixed legacy: commanders appreciated photographic reconnaissance, but paid little attention to electronic warfare or ELINT collection.

With no apparent military threat and public pressure to demobilize, US military capability declined rapidly following World War II. Faced with limited budget appropriations, air leaders cut all non-essential programs. Viewed as "nice to have," electronic reconnaissance did not survive and cuts reduced photographic reconnaissance to limited photo mapping duties. Instead, senior

airmen battled to retain a strategic bombardment force that supported their claim for organizational independence. With the creation of the United States Air Force in September 1947, airmen realized their dream, but an emerging Soviet threat dramatized Air Force weakness.

As Cold War tensions mounted, the "need to know" dominated war planning. Limited by fiscal constraints and inadequate ground forces, American leaders struggled to form an appropriate military response to Soviet military potential. With no apparent alternatives, the Joint Chiefs of Staff adopted Joint Basic Outline War Plan PINCHER based upon the precepts of strategic air war. Recognizing the limited US atomic arsenal, PINCHER called for a precision bombing campaign against vital Soviet industrial targets; however, the plan revealed a lack of strategic intelligence that jeopardized strategic bombing doctrine. Without adequate target information, maps, weather data, and knowledge of enemy air defenses, a strategic air campaign risked defeat.

The intelligence shortfalls of PINCHER prompted postwar strategic aerial reconnaissance. The first reconnaissance sorties of August 1946 explored the Arctic to assess polar routes for strategic bombers. Photographic reconnaissance mapped little-known polar regions and improvised Ferret aircraft searched for Soviet radars. Later efforts probed Soviet air defenses in Western Europe. Unfortunately, these uncoordinated, *ad hoc* measures paled in comparison to the need for target information.

With President Truman's declaration of containment, the Air Force advanced organizational steps to improve strategic aerial reconnaissance. Aware of intelligence gaps, the Air Staff established formal procedures for peacetime strategic reconnaissance in 1948 and eventually placed it under Strategic Air Command control. Beginning in 1947, improved B-29 Ferret

aircraft collected valuable information about Soviet radar defenses along Communist borders and photo reconnaissance planes attempted oblique photography of the Chukotski peninsula. Nevertheless, technological limitations blocked efforts to gather target information from the Soviet heartland. Existing jet aircraft lacked sufficient range and modified bombers lacked the speed and altitude needed for survival. This technological hurdle confronted aerial reconnaissance throughout the early years of the Cold War.

Operational constraints affected Air Force doctrine. For nearly thirty years, air power advocates stressed strategic bombing as the epitome of warfare. In the United States, airmen advanced a doctrine of precision bombardment of carefully selected industries to destroy the enemy's capacity for war. Despite heavy loses over Europe in the opening phase of the Combined Bomber Offensive and RAF arguments for night area bombing, Air Force leaders believed World War II experience vindicated their doctrinal assertions. Although airmen acknowledged the importance of the atomic bomb, postwar studies by the United States Strategic Bombing Survey and the Spaatz Board reinforced their belief in precision bombing. Nevertheless, faced with a lack of strategic target intelligence, the Air Force abandoned the doctrine. With JCS approval of war plan BROILER in February 1948, the planned strategic air campaign shifted to atomic urban area bombing which required less precise intelligence. Influenced by the fear surrounding the Berlin Crisis and the Soviet detonation of an atomic bomb in August 1949, the Air Force considered war a distinct possibility. In response, the JCS approved war plan OFFTACKLE in November 1949. OFFTACKLE's reliance on a massive atomic attack on Soviet cities completed a doctrinal transformation by the Air Force. Instead of selecting key industrial targets within enemy cities for destruction by precision bombing,

air planners now targeted entire cities with atomic bombs. Therefore, between 1945 and 1953, strategic aerial reconnaissance proved to be more than a tool for war planning: the limits of aerial reconnaissance shaped strategic doctrine.

The sudden outbreak of the Korean War represented a test of postwar Air Force reconnaissance. Viewed as a potential prelude to a general war, the Korean conflict demonstrated the value of aerial reconnaissance in providing both tactical and strategic intelligence. Expanded to near global coverage, strategic aerial reconnaissance played a key role in assessing Communist military capabilities. Electronic, as well as photographic, intelligence proved its worth; however, the unexpected Chinese intervention in Korea showed the perils of inadequate intelligence. Furthermore, lessons based on Korean experiences implied a threat to US war plans. Obsolescent equipment and inadequate attention the entire intelligence cycle raised doubts over plans for strategic air war. Intelligence shortfalls showed that planning, direction, production, and dissemination of intelligence material mattered as well as collection. Without well-trained analysts, photo interpreters, electronic specialists, and other intelligence personnel, even good aerial photographs or clear Ferret recordings would go to waste. Therefore, the FEAF assessment of reconnaissance during Korea stressed the need for a fully manned, adequately funded, reconnaissance organization to exploit intelligence potential in peacetime.

The close of the Korean War ended a phase of US strategic aerial reconnaissance marked by inadequate capability. Before this time, meager funding and technological limitations handicapped US strategic intelligence collection even though policy makers desperately required information. With greatly expanded wartime appropriations, the Air Force benefited from the

introduction of the new jet Boeing B-47 bomber in 1953 and reconnaissance versions of the RB-47 beginning in 1954. Of greater importance, Clarence Kelly Johnson's revolutionary Lockheed U-2 represented a technological breakthrough. From 1956 to 1960, overflights of the Soviet Union using the high-flying, long-range aircraft provided photographic intelligence previously impossible. For the first time, American policy makers acquired substantive intelligence regarding Soviet military capabilities and the JCS gained vital target information for war planning. Although Soviet surface-to-air missiles ended the U-2's immunity in May 1960 and caused an unprecedented international scandal, the launch of *Discoverer 13* three months later opened a new era of satellite reconnaissance.

The study of aerial reconnaissance in the early years of the Cold War contributes to military history by emphasizing the importance of intelligence in strategic planning. By concentrating on the operational aspects of strategic intelligence and war planning, this study does not challenge the body of literature focused on the theoretical, political, and moral aspects of nuclear strategy. Instead, the study of strategic aerial reconnaissance complements earlier works by focusing on the means to assess the enemy threat. In the context of the Cold War, military and political leaders feared Soviet potential, but knew little of actual enemy capabilities. With the memory of Pearl Harbor fresh, this fear demanded vigilance. Hence, strategic aerial reconnaissance represented a vital tool for policy makers. Moreover, the limits of reconnaissance capability in the first eight years of the Cold War emphasizes the influence of technology upon intelligence collection. Understanding the limits of reconnaissance technology in the early Cold War explains the

uncertainty and fear which underscored JCS plans.³ Aware of US military weakness, the Joint Chiefs of Staff proved well aware of the wisdom behind Sun Tzu's famous line: "Therefore I say: 'Know the enemy and know yourself; in a hundred battles you will never be in peril.'"⁴

Aerial reconnaissance provided the best means to "know the enemy" during the early years of the Cold War. As the Cold War fades, diminished overt military threat will result in widespread reduction of US armed forces. Hopefully, American military leaders will not repeat the errors that followed World War II. Well-trained, well-equipped reconnaissance units and intelligence organizations provide the means to assess future threats and shape strategic alternatives. Furthermore, adequate collection capability alone is not sufficient: constant attention to the entire intelligence cycle is necessary to assure national security in a world of change. Otherwise, the less well known verses of Sun Tzu may again prove true:

When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal.

If ignorant both of your enemy and of yourself, you are certain in every battle to be in peril.⁵

³ The anxiety surrounding the "search for Scuds" in the recent war with Iraq illustrates the limits of even today's technology and its impact on strategy.

⁴ Sun Tzu, *The Art of War*, p. 84.

⁵ Ibid.

APPENDIX A RADAR PRINCIPLES

For those who are not technologically inclined, discussion of radar characteristics, Ferret operations, and jamming techniques can be confusing. Fortunately, the principles behind radar (originally used as an acronym, RAdio Detection And Ranging) are relatively simple. The following appendix summarizes a United States Navy publication, *Radar Bulletin No. 12 (RADTWELVE): Airborne Radar Countermeasures Operator's Manual*, published in 1946.

Radar works on the principle of echoes. Just as it takes a certain amount of time for a voice echo to return after shouting, it takes a short amount of time for radio waves to return after they bounce off an object. A radar measures this time and determines the distance of the object. In other words, a radar station is a two-way radio system that includes a transmitter and a receiver. The transmitter sends out short pulses of high-frequency radio waves and the receiver detects the echoes of the waves after they have bounced off a target. The time between transmitted pulse and received echo is converted into the distance of the object. Since the echo returns with far less energy than originally transmitted, an amplifier works with the receiver and the results are projected upon an oscilloscope. Because the whole process occurs in fractions of a second, the oscilloscope, or radar screen, presents a continuous picture.

The primary purpose of electronic reconnaissance, or Ferret, aircraft centers on locating enemy radar stations and analyzing the performance characteristics of the set. The Ferret uses radar intercept receivers to detect enemy radar transmissions and a pulse analyzer to display the radio waves received upon an oscilloscope for analysis. The Ferret operator (called radar observer, RCM officer, Electronic Warfare Officer (EWO), Raven, or Crow at various times) seeks the following performance characteristics:

Frequency -- The usual way of recognizing a radar is on the basis of the carrier frequency of the radio waves it sends out. This frequency is usually expressed in terms of megacycles, or millions of cycles per second. Thus, the radar frequency is like the radio channel of a conventional radio set.

Pulse Repetition Frequency -- a measure of the rate at which radio pulses are transmitted. Radars do not transmit continuously. They must pause briefly in order to receive the returning echo. The rate of pulses, or PRF, produce an audible humming sound or whine. Proficient Ravens recognize individual radar types by their sound.

Pulse Length -- the duration of the pulse of transmitted radio energy. The pulse length are usually so brief that they are expressed in millionths of a second or microseconds.

Beam Width -- A radar sends out a beam of radio-frequency energy much like a searchlight sends out a beam of light. The beam width is expressed in degrees. Less sharp than a beam of light, the radar beam usually measures ten or fifteen degrees wide. Although a sharper beam is more accurate, it is also more likely to miss an elusive target.

Lobe Switching -- a means of determining the bearing of a target. The radar looks to one side and then to the other of a particular target. When the radar is looking at equal angles to each side of the target, it is said to be "on target" or "locked on." Lobe switching occurs rapidly, roughly fifty times per second in certain radars, and indicates the relative accuracy of the radar.

From these performance characteristics, ferrets determined the function of the radar. For example, Early Warning radars featured high power, low frequency, low PRF, long pulse length, and wide beam widths to achieve high

rates of detection at great distances. On the other hand, Ground Controlled Intercept (GCI) sets displayed higher frequencies and PRFs, shorter pulse lengths, and narrower beam widths for greater accuracy, but shorter ranges. Additionally, Ferrets recorded new signals that allowed analysts to track enemy technical progress.

PLATE 2. Boeing RB-50G Superfortress

Fennet Aircraft



Standard Aircraft Characteristics

BY AUTHORITY OF
THE SECRETARY
OF THE AIR FORCE

RB-50G
SUPERFORTRESS
Boeing

FOUR

PRATT

RB-50G Super

Aircraft

PLATE 2. Boeing RB-50G Superfortress

Ferret Aircraft

*istics and Aircraft Characteristics*

FOUR I

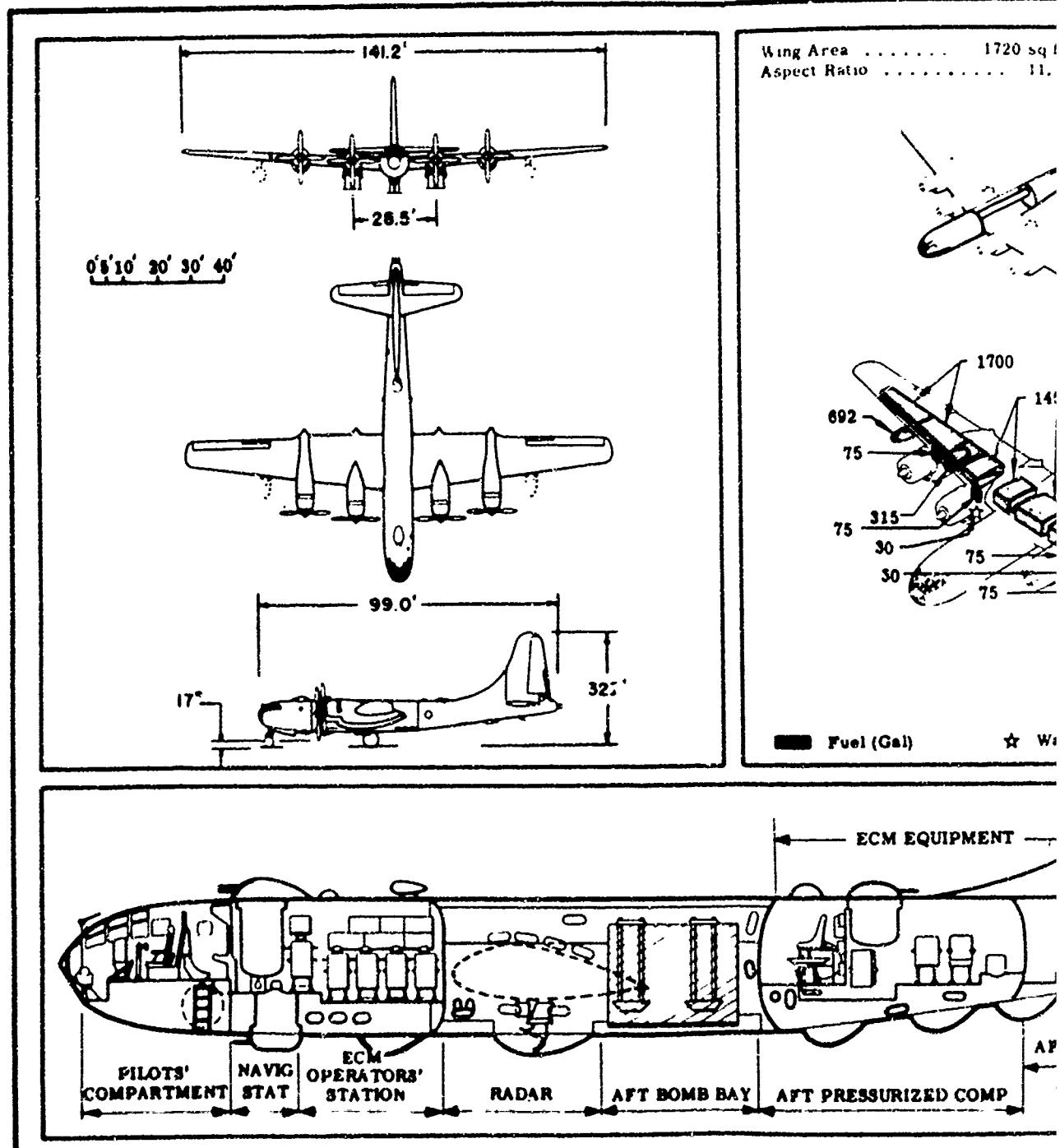
PRATT

RB-50G
SUPERFORTRESS
Boeing

FOUR R-4360-35

PRATT & WHITNEY

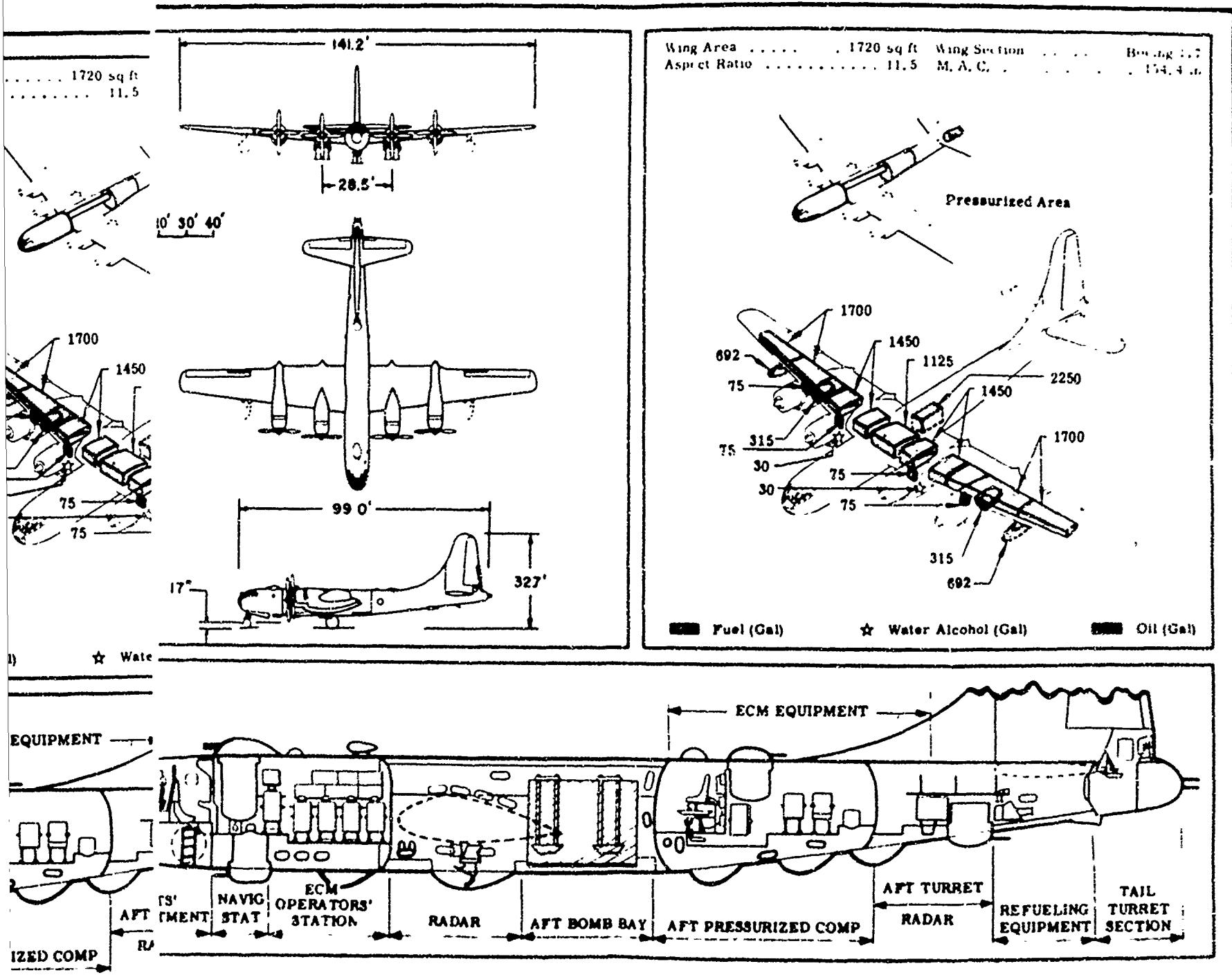
PLATE 3. RB-50G Interior Layout



RB-50G

UNCLASSIFIED

PLATE 3. RB-50G Interior Layout



U N C L A S S I F I E D

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APPENDIX B

GLOSSARY

Air Photographic Reconnaissance -- The obtaining of information by air photography -- divided into three types: a. strategic photographic reconnaissance; b. tactical photographic reconnaissance; and c. survey/cartographic photography -- air photography taken for survey/cartographic purposes and to survey/cartographic standards for accuracy. It may be strategic or tactical. (JCS Pub 1, p. 19)

Air Reconnaissance -- The acquisition of intelligence information by employing visual observation and/or sensors in air vehicles. (JCS Pub 1, p. 20)

Communications Intelligence -- Technical and intelligence information derived from foreign communications by other than the intended recipients. Also called COMINT. (JCS Pub 1, p. 80)

Electronic Reconnaissance -- The detection, identification, evaluation, and location of foreign electromagnetic radiations emanating from other than nuclear detonations or radioactive sources. (JCS Pub 1, p. 128)

Electronics Intelligence -- Technical and intelligence information derived from foreign non-communications electro-magnetic radiations emanating from other than nuclear detonations or radioactive sources. Also called ELINT. (JCS Pub 1, p. 128)

Electronic Warfare -- Military action involving the use of electromagnetic energy to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of electromagnetic spectrum. Also called EW. There are three divisions of electronic warfare:

a. **electronic countermeasures** -- That division of electronic warfare involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. Also called ECM. Electronic countermeasures include:

(1) **electronic jamming** -- The deliberate radiation, reradiation, or reflection of electromagnetic energy for the purpose of disrupting enemy use of

electronic devices, equipment, or systems.

(2) **electronic deception** -- The deliberate radiation, reradiation, alteration, suppression, absorption, denial, enhancement, or reflection of electromagnetic information and to deny valid information to an enemy.

b. **electronic counter-countermeasures** -- That division of electronic warfare involving actions taken to ensure friendly effective use of the electromagnetic spectrum despite the enemy's use of electronic warfare. Also called ECCM.

c. **electronic warfare support measures** -- That division of electronic warfare involving actions taken under direct control of an operational commander to search for, intercept, identify, and locate sources of radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support measures provide a source of information required for immediate decisions involving electronic countermeasures (ECM), electronic counter-countermeasures (ECCM), avoidance, targeting and other tactical employment of forces. Also called ESM. Electronic warfare support measures data can be used to produce signals intelligence (SIGINT), both communications intelligence (COMINT) and electronics intelligence (ELINT). (JCS Pub 1, p. 129)

Ferret -- 1. An aircraft, ship, or vehicle especially equipped for the detection, location, and analyzing of electromagnetic radiation. (JCS Pub 1, p. 143) 2. In 1949, the term was defined as "aircraft specifically modified to perform electronic reconnaissance only."¹

Intelligence -- The product resulting from the collection, processing, integration, analysis, evaluation and interpretation of available information concerning foreign countries or areas. (JCS Pub 1, p. 188)

Intelligence cycle -- The steps by which information is converted into intelligence and made available to users. There are five steps in the cycle:

a. **planning and direction** -- Determination of intelligence requirements, preparation of a collection plan, issuance of orders and requests to information collection agencies, and a continuous check on the productivity of collection agencies.

b. **collection** -- Acquisition of information and the provision of this information to processing and/or production elements.

¹ Letter, General Lauris Norstad to Commanding General, Strategic Air Command, Subject: USAF Electronic Reconnaissance Program, Tab A, 21 Jul 1949, File: 2-8100 to 2-8199, Box 45, Entry 214, RG 341, NA.

c. processing -- Conversion of collected information into a form suitable to the production of intelligence.

d. production -- Conversion of information into intelligence through the integration, analysis, evaluation, and interpretation of all source data and the preparation of intelligence products in support of known or anticipated user requirements.

e. dissemination -- Conveyance of intelligence to users in a suitable form. (JCS Pub 1, p. 189)

Intercept Receiver -- A receiver designed to detect and provide visual and/or aural indication of electromagnetic emissions occurring within the particular portion of the electromagnetic spectrum to which it is tuned. (JCS Pub 1, pp. 190-191)

Need to Know -- A criterion used in security procedures that requires the custodians of classified information to establish, prior to disclosure, that the intended recipient must have access to the information to perform his official duties. (JCS Pub 1, p. 248)

Proximity Fuze -- A fuze wherein primary initiation occurs by remotely sensing the presence, distance, and/or direction of a target or its associated environment by means of a signal generated by the fuze or emitted by the target, or by detecting a disturbance of a natural field surrounding the target. (JCS Pub 1, p. 292)

Oblique air photograph -- An air photograph taken with the camera axis directed between the horizontal and vertical planes. Commonly referred to as an oblique: a. **high oblique** -- One in which the apparent horizon appears; and b. **low oblique** -- One in which the apparent horizon does not appear. (JCS Pub 1, p. 259)

Pulse Repetition Frequency (PRF)-- In radar, the number of pulses that occur each second. Not to be confused with transmission frequency which is determined by the rate at which cycles are repeated within the transmitted pulse. (JCS Pub 1, p. 294)

Reconnaissance -- A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Sometimes called recce. (JCS Pub 1, p. 304)

Security Classification -- A category to which national security information and material is assigned to denote the degree of damage that unauthorized disclosure would cause to national defense or foreign relations of the United

States and to denote the degree of protection required. There are three such categories:

- a. **top secret** -- National security information or material that requires the highest degree of protection and the unauthorized disclosure of which could reasonably be expected to cause exceptionally grave damage to the national security. Examples of "exceptionally grave damage" include armed hostilities against the United States or its allies; disruption of foreign relations vitally affecting the national security; the compromise of vital national defense plans or complex cryptologic and communications intelligence systems; the revelation of sensitive intelligence operations; and the disclosure of scientific or technological developments vital to national security.
- b. **secret** -- National security information or material that requires a substantial degree of protection and the unauthorized disclosure of which would reasonably be expected to cause serious damage to the national security. Examples of "serious damage" include disruption of foreign relations significantly affecting the national security; significant impairment of a program or policy directly related to the national security; revelation of significant military plans or intelligence operations; and compromise of significant scientific or technological developments relating to national security.
- c. **confidential** -- National security information or material that requires protection and the unauthorized disclosure of which could reasonably be expected to cause damage to the national security. (JCS Pub 1, pp.327-328)

Signals Intelligence -- A category of intelligence information comprising all communications intelligence, electronics intelligence, and telemetry intelligence. Also called SIGINT. (JCS Pub 1, p. 334)

Strategic Air Warfare -- Air combat and supporting operations designed to effect, through the systematic application of force to a selected series of vital targets, the progressive destruction and disintegration of the enemy's war-making capacity to a point where the enemy no longer retains the ability or the will to wage war. Vital targets may include key manufacturing systems, sources of raw material, critical material, stockpiles, power systems, transportation systems, communication facilities, concentration of uncommitted elements of enemy armed forces, key agricultural areas, and other such target systems. (JCS Pub 1, p. 349) [Note: The current definition is the same as the 1949 definition of the term.]²

² Memorandum for Lt. General H. R. Harmon from E. Moore, Brig. General, USAF, Chief, Air Intelligence Division, 21 April 1949, 2-7217, File: 2-7200 to 2-7299, Box 45, RG 341, NA.

Strategic Intelligence -- Intelligence that is required for the formation of policy and military plans at national and international levels. Strategic intelligence and tactical intelligence differ primarily in level of application but may also vary in terms of scope and detail. (JCS Pub 1, p. 350)

Tactical Air Reconnaissance -- The use of air vehicles to obtain information concerning terrain, weather, and the disposition, composition, movement, installations, lines of communications, electronic and communication emissions of enemy forces. Also included are artillery and naval gunfire adjustment, and systematic and random observation of ground battle area. (JCS Pub 1, p. 361)

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Abbreviations

AC/AS-2	Assistant Chief of Air Staff-2 (Intelligence)
AFB	Air Force Base
AFM	Air Force Manual
AOC	Association of Old Crows, Alexandria, Virginia
DNC	Democratic National Committee Library Clipping File
FEAF	Far East Air Forces
HSTL	Harry S. Truman Library, Independence, Missouri
LOC	Library of Congress
MFR	Memorandum for Record
NA	Modern Military Branch, National Archives, Washington, D. C.
NHC	Naval Historical Center, Washington Navy Yard, Washington, D.C.
ret	Retired
TS	Top Secret
USAF	United States Air Force
USAFHRC	United States Air Force Historical Research Center, Maxwell Air Force Base, Alabama
USAFM	United States Air Force Museum, Wright Patterson AFB, Ohio

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